African-owned firms and investment in learning

Local firms in the Ethiopian floriculture export sector

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African-owned firms and investment in learning: Local firms in the Ethiopian floriculture export sector

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Abstract

Locally owned firms need to develop their technological capabilities since accumulating firm-level capabilities is one of the most fundamental factors needed for structural change and economic development in African countries. However, building technological capabilities usually involves costly and risky investment with uncertain outcomes. Therefore, it is not usually appealing for local firms to invest in learning and develop their capabilities unless they are incentivised and compelled by the external environment. Firm-level capability building is the result of an interactive process between the internal learning effort of firms and their external environment, but African-owned firms usually face an unfavourable external environment with widespread market failures and few supporting institutions, which increase the learning costs and the uncertainties of a return on investment. As a result, the firms usually have low technological capabilities, which in turn makes it harder for these firms to acquire, absorb and adapt the foreign knowledge required for foreign direct investment spillovers and upgrading in global value chains to occur.

Despite the difficult circumstances, locally owned firms in some African countries manage to compete in global value chains, but there is limited knowledge on how those firms became internationally competitive through investing in learning and building capabilities, how they relate to foreign firms and global value chain actors, and whether they try and are able to move into higher value activities within global value chains. In order to contribute to filling this gap in literature, the thesis investigates under which conditions Ethiopian-owned firms in the floriculture export sector invest in building their technological capabilities, considering the national institutional context and floriculture global value chain dynamics in which firms operate. Methodologically, the thesis combines the technological capabilities and global value chain approaches in order to identify more precisely what kind of capabilities are required to enter, remain competitive and upgrade within floriculture global value chains. It uses a uniquely designed firm-level survey to collect the data used to measure the capabilities of Ethiopian floriculture firms, and uses data collected through a firm history method to examine the factors influencing whether and how firms invest in learning.

The findings show that local firms' initial investment in the Ethiopian floriculture export sector was mainly incentivised by government industrial policy, while a Dutch development program played an important but less prominent role. Systems of innovation, foreign direct investment spillovers, global value chain governance, and the Dutch development program served as sources of knowledge and catalysed learning to various degrees. Nevertheless, firms' learning efforts were influenced initially by sector specific characteristics, such as the Dutch auction offering relatively attractive rewards, the inherent narrow margin for failure that exists in the sector, and the absence of a significant domestic market for cut-flowers. However, firms' further learning efforts and subsequently their level of technological capabilities was driven mainly by firm-specific characteristics, such as the owner's perception of risk and reward about the export sector as well as in relation to their diversified business

groups. Most of the Ethiopian floriculture firms had other business, and they made calculations of risk and reward about the diversified business group as a whole, which shaped their effort in relation to their flower export firm.

A key contribution of the thesis is that it distinguishes conceptually three dimensions of local firms' technological capability building process: incentivizing firms' initial investment, sources of knowledge or expanding knowledge sources locally and catalysing learning, and compelling firms' learning effort. In reality, the three dimensions of TC building process are interactive and may not be separable from each other, but the conceptual distinction is important in order to provide a more nuanced view about how firms' learning takes place and more specifically how national and global factors influence firms' TC building process through shaping one or more of the three dimensions. These three dimensions can be useful in assessing processes of learning and firms' TC building in other sectors as well as contexts.

The key factors that shaped firm-level capability building processes in the Ethiopia floriculture export case are industrial policy, national innovation systems, foreign direct investment spillovers, global value chain governance, a Dutch development program as well as firm specific characteristics. Thus, the thesis confirms much of the existing arguments in the literature in relation to these key factors, but it also elaborates on the causal mechanisms, refining our knowledge on these processes and how they work in a less developed African country such as Ethiopia. In particular, the thesis highlights the success and failures of the industrial policy of Ethiopian floriculture as lessons for policy makers in Ethiopia and other African as well as other low-income countries. It also discusses the role of the Dutch development program as a unique factor, not conceptualized in the literature, as the Dutch program was driven by both development cooperation objectives and the economic interest of the Dutch auction, making it a hybrid that has characteristics of a global value chain actor and a kind of government industrial policy financed by foreign aid. This finding points to opportunities for alternative forms of support for local firm learning.

Abstract (Danish)

Lokalt ejede firmaer skal udvikle deres teknologiske kompetencer, da akkumulering af kompetencer på virksomhedsplan er en af de mest grundlæggende faktorer, som er nødvendige for strukturelle ændringer og økonomisk udvikling i afrikanske lande. Opbygning af teknologiske kompetencer indebærer dog normalt dyre og risikable investeringer med usikre resultater. Derfor er det normalt ikke attraktivt for lokale virksomheder at investere i læring og udvikle deres kompetencer, medmindre de er motiveret og tvunget af ydre omstændigheder. Opbygningen af kompetencer på virksomhedsplan er resultatet af en interaktiv proces mellem virksomhedernes interne læringsindsats og deres eksterne miljø, men afrikansk-ejede virksomheder står normalt over for et ugunstigt eksternt miljø med omfattende markedssvigt og få støtteinstitutioner, hvilket øger læringens omkostninger og usikkerheden af et investeringsafkast. Som et resultat heraf har virksomhederne normalt begrænsede teknologiske evner, hvilket igen gør det sværere for disse virksomheder at erhverve, absorbere og tilpasse den udenlandske viden, der kræves med henblik på at en spillover-effekt af udenlandske direkte investeringer og en opgradering i globale værdikæder kan finde sted.

På trods af de vanskelige forhold lykkes lokalt ejede virksomheder i enkelte afrikanske lande at konkurrere i globale værdikæder, men der er begrænset viden om, hvordan disse firmaer blev internationalt konkurrencedygtige ved at investere i læring og opbygge kompetencer, hvordan de står i forbindelse med udenlandske firmaer og globale værdikædeaktører, og om de forsøger og er i stand til at engagere sig i større værdiaktiviteter i globale værdikæder. For at bidrage til at udfylde denne kløft i litteraturen undersøger afhandlingen under hvilke betingelser etiopisk-ejede firmaer inden for blomsterdyrkningseksportsektoren investerer i at opbygge deres teknologiske kompetencer, i betragtning af den nationale institutionelle kontekst og blomsterdyrkningens globale værdikæde-dynamik i hvilken virksomheder opererer. Metodisk kombinerer afhandlingen de teknologiske kompetencer og de globale værdikæde-tilgange for at identificere mere præcist, hvilke former for kompetencer, der kræves for at forblive konkurrencedygtige og opgradere inden for blomsterdyrkningens globale værdikæder. Afhandlingen bruger en unikt designet spørgeundersøgelse til virksomheder for at indsamle de data, der bruges til at måle kompetencerne hos etiopiske blomsterproducenter og bruger data indsamlet gennem en virksomhedshistorisk metode til at undersøge de faktorer, der påvirker om og hvordan virksomheder investerer i læring.

Resultaterne viser, at lokale firmaers initiale investering i den etiopiske blomsterdyrkningseksportsektor primært var motiveret af regeringens industripolitik, mens et hollandsk udviklingsprogram spillede en vigtig, men mindre fremtrædende rolle. Innovationssystemer, spillover-effekter af udenlandske direkte investeringer, global værdikædestyring og det hollandske udviklingsprogram tjente som kilder til viden og katalyseret læring i forskellige grader. Ikke desto mindre blev virksomhedernes læringsbestræbelser indledningsvis påvirket af sektorspecifikke karakteristika

som for eksempel den hollandske auktion, der tilbød relativt attraktive belønninger, den naturlige snævre margin for fiasko, som eksisterer i sektoren og fraværet af et betydeligt indenlandsk marked for snitblomster. Men firmaernes videre læringsindsats og efterfølgende deres niveau af teknologiske kompetencer blev primært drevet af virksomhedsspecifikke forhold, som for eksempel ejerens opfattelse af risiko og belønning for eksportsektoren såvel som i forhold til deres diversificerede erhvervsgrupper. De fleste af de etiopiske blomsterdyrkningsvirksomheder havde anden forretning, og de lavede beregninger af risiko og belønning for den diversificerede erhvervskoncern som helhed, hvilket havde indvirkning på deres indsats i henhold til deres blomstereksportvirksomhed.

Et væsentligt bidrag fra afhandlingen er, at det konceptuelt skelner mellem tre dimensioner af lokale virksomheders teknologiske kompetenceopbygningsproces: motivation af virksomheders første investering, kilder til viden eller udvidelse af videnkilder lokalt og katalysering af læring og tilskyndelse til virksomheders læringsindsats. I virkeligheden er de tre dimensioner af den teknologiske kompetenceopbygningsproces interaktive og bør ikke adskilles fra hinanden, men den konceptuelle sondring er vigtig for at give en mere nuanceret opfattelse af, hvordan virksomhedernes læring finder sted, og mere specifikt, hvordan nationale og globale faktorer påvirker virksomhedernes teknologiske kompetenceopbygningsproces ved at påvirke en eller flere af de tre dimensioner. Disse tre dimensioner kan være nyttige i vurderingen af læringsprocesser og virksomhedernes teknologiske kompetenceopbygning i andre sektorer og kontekster.

Nøglefaktorerne, der påvirkede opbygningsprocesser på virksomhedsniveau, i tilfældet med Etiopiens blomsterdyrkningseksportsektor er industripolitik, nationale innovationssystemer, spillover-effekter af udenlandske direkte investeringer, global værdikædestyring, et hollandsk udviklingsprogram samt virksomhedsspecifikke kendetegn. Afhandlingen bekræfter således en del af de eksisterende argumenter i litteraturen i relation til disse nøglefaktorer, men uddyber samtidig årsagssammenhænge, raffinerer vores viden om disse processer og om hvordan de fungerer i et mindre udviklet afrikansk land som Etiopien. Afhandlingen fremhæver især succesen og fejlene i den etiopiske blomsterdyrknings industripolitik som en lektie for politiske beslutningstagere i Etiopien og andre afrikanske såvel som andre lavindkomstlande. Den diskuterer også det hollandske udviklingsprograms rolle som en unik faktor, der ikke er konceptualiseret i litteraturen, da det hollandske program blev drevet af både udviklingssamarbejdsmål og den hollandske auktions økonomiske interesse, hvilket gør det til en hybrid, der har kendetegn af en global værdikædeaktør og en form for offentlig industripolitik finansieret af udenlandsk bistand. Denne konklusion peger på muligheder for alternative former for støtte til lokal virksomhedslæring.

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Above all, I thank God almighty in all and for all!

List of Acronyms

CBI	Centre for the Promotion of Imports from Developing Countries
DBE	Development Bank of Ethiopia
EFTA	European Free Trade Association
EHDA	Ethiopian Horticulture Development Agency
EHPEA	Ethiopian Horticulture Producers and Exporters association
EAL	Ethiopian Airlines
EU	European Union
FDI	Foreign Direct Investments
FFP	Fair Flowers Fair Plants
GPNs	Global Production Networks
GVCs	Global Value Chains
ITC	International Trade Centre
MNCs	Multinational Corporations
MPS	Milieu Project Sierteelt
R&D	Research and Development
TC	Technological Capabilities
UK	United Kingdom
UNCTAD	United Nations Conference for Trade and Development
UNECA	United Nations Economic commission for Africa
UNIDO	United Nations Industrial Development Organization
US	United States
USAID	United States Agency International Development

1. Introduction

After decades of economic collapse and deindustrialisation, Sub-Saharan African[1] economies have seen growth since the turn of the twenty-first century, but it resulted little in terms of structural transformation and economic development (UNCTAD 2014; Noman and Stiglitz 2015). The economies remained largely dependent on traditional agriculture and even where the share of agriculture declined, it is replaced by growth of low productivity activities in service sectors, while manufacturing and knowledge-based sectors remained scant. This is because the growth was driven mainly by increases in international commodity prices and consumption fuelled by government spending and foreign aid (Whitfield et al 2015). Economic development is largely the result of increases in productivity, which is mainly the result of learning how to do things better (Arrow 1962; Kaldor 1966; Stiglitz and Greenwald 2014). This thesis also positions itself among the latter literature and assumes that economic development fundamentally requires the expansion of knowledge-based sectors, which in turn, needs accumulating capabilities at the level of firms, labour force, economy and society to drive the transformation and sustain the development (Amdsen 2001; Nubler 2014). In other words, capabilities are means for and outcome of exploiting and accumulating knowledge assets, particularly, building technological capabilities (TC) at the level of firms is at the core of this cumulative process.

But TCs are not the technology embodied in capital goods, patents or manuals; nor are they educational qualifications possessed by the employees, which are relatively easy to accumulate. But these are the 'raw materials' with which capabilities are put to work and a receptive base for the acquisition of capabilities determined (Lall 1993a; Bell 2007). Thus, TCs are firm specific knowledge assets embodied in people and organisational structures that are concerned with both ongoing production and innovation. They are skills, technical knowledge and organisational coherence to make industrial technologies function in an enterprise. It inherently involves a bundle of tacit knowledge, which may not be consciously known, let alone be readily transferrable because the tacit knowledge is highly specific to functions and contexts. Therefore, they can only be acquired through technological effort (learning effort) in the specific activity and context (Bell and Pavitt 1995). Thus, conceptually, Lall, Bell and Pavit make a distinction between learning by doing and the active search for knowledge that cannot be obtained by learning-by-doing with existing firm production.

The process of accumulating TC can start through expanding light-tech industries that are often labour intensive and skill nurturing, such as manufacturing. The experience of early and newly industrialised countries, as well as late industrialisation, pointed to the greater potential of manufacturing in driving structural change as it has shown a higher tendency to trigger positive 'cumulative causations' through

[1] In this thesis, when it refers Africa, it means Sub-Saharan Africa, but the two terms are used interchangeably.

rapid increases in productivity and employment as well as through its effects spreading to other sectors in the national economy (Kaldor 1966; Amsden 2001; McMillan and Rodrik 2011). Nowadays however, these characteristics are not limited to manufacturing, but found in other sectors as well, such as agriculture export sectors. For example, fresh products like floriculture or horticulture in general showed large potential for employment and productivity growth within and outside the sector, following technological advances in transport and communication. The emergence of GVCs alongside an increase in trend like market segmentation, non-market coordination and non-price competition means that product differentiation, innovation, and value-added become prominent in the agro-industries (Humphrey and Memedovic 2006; Page 2015). In addition, the sectors' tendency to create linkages with other industries such as packaging, logistics, and transport sectors broadened its growth potential in a national economy.

It is noted that African firms generally lack capabilities to participate in both manufacturing and agribusiness export sectors (Page 2015). However, the process of learning and building capabilities among African-owned firms has been understudied. The existing literature, such as Lall et al 1994; Wangwe (1995); Biggs et al. (1995); Lall (1999); Lall & Pietrobelli (2002); Rasiah (2005) and Wignaraja (2002), was written before GVCs began playing such an essential role and thus do not consider TC building within GVC dynamics. In the contemporary global economy, an increasing share of production and trade (including FDI) takes place in GVCs, in which functions get fragmented and dispersed across borders and reintegrated through coordination and governance exercised by 'lead firms'. Thus, participating in new export sectors means participating in global value chains, which have to be taken into account when examining firm-level TC building process.

Following the increasing flow of FDI and expansion of GVCs in Africa, there is a wide range of literature that examined African countries entering non-traditional export sectors. GVCs have led to the wide spread of knowledge assets or productive activities to developing countries, enabling low-income countries to participate in the gains from producing the world's most complex and sophisticated products by specialising in certain functions (Whittaker et al 2010; Baldwin et al. 2014; Ferrantino and Schmidt 2018). But studies also showed that development of GVCs sometimes involve consolidation and supply chain rationalisation with lead firms aiming to work with larger and more capable suppliers, which has increased entry barriers for local firms in low income countries (Dolan and Humphrey 2000; Staritz 2011). The existing literature investigates various developmental aspects of GVC participation usually at the aggregate industry level, without unpacking firm-level learning and TC building process. For instance, the studies of Gibbon and Ponte (2005), Goger et al (2014), and Barrientos and colleagues (2015) are based on several African countries' traditional export sectors (e.g. coffee) and non-traditional export sectors (e.g. horticulture, apparel). They highlight factors that constrained African industries and firms' participation and upgrading in the GVCs as well as the opportunities for economic and social upgrading. Similar issues are also examined in the context of FDI/GVC dynamic, for instance, Phelps

and Wanjiru 2009; Staritz and Morris 2013; Staritz et al 2016. Furthermore, the challenge of African countries and firms in creating innovative clusters and industrial learning are examined in the edited volume of Oyelaran-Oyeyinka and McCormick (2007).

The ability and willingness of firms in African countries to build their TC is determined by several factors. Following Lall and his colleagues (Lall 1992, Lall et al 1994), these factors can be classified into three groups: incentive environment that is assumed to determine the 'demand' side of TC building which might be internal factors like firms' inherent need to get into production and commercially succeed; it might be also external ones such as growth prospect and stability of market demand. The second group is called 'supply' factors, constituting building blocks for TC such as finance, skills, information, and knowledge that are needed to develop TC; and the last group refers to institutions composing 'the rules of the game' under which firms play as well as the organisations that support the functioning of the market for 'supply' factors. In the contemporary global economy, these three determinant factors of firms' TC building process - incentive environment, the supply factors and institutions - arise from national and global contexts which operate in complex interactions and influence firm-level TC building processes.

Technology transfer and building capabilities is a difficult, costly and time-consuming process that often involves loss-making periods, which largely drives firms' reluctance to invest in knowledge assets where the return takes time and is uncertain (Lall 1992; Khan, 2009). But, like any other investment, firms' investments in TC are highly sensitive to the incentive environment, the cost of investment and the available resources (Biggs et al. 1995). Thus, building capabilities is more difficult for locally owned firms in sub-Saharan Africa, as they usually operate in an environment where market and institutional failures are pervasive, which pushes up learning costs and uncertainties (UNCTAD-UNIDO 2011).

Foreign direct investment (FDI) is perceived as an important source of knowledge from which local firms learn and build their capabilities (Narula and Lall 2004; Fu et al 2011). The assumption is that FDI possesses proprietary knowledge and richer experiences which can be transferred to domestic firms through various means. However, empirical literature shows mixed results, with sometimes FDI 'crowding out' local firms or FDI operating in enclave away from the domestic economy, while in other situations FDI creating significant spillover (Günther 2005; Paus and Gallagher 2008; Farole et al 2014; Akyuz 2015). The determining factors of potential spillover are primarily associated with the characteristics of the foreign investor (multinational corporations (MNC) and its FDI); and absorptive capacity of the host country related to physical infrastructure, national innovation systems and more importantly, the absorptive capacity of firms which is part of their TC (Narula and Dunning 2010). But African countries and their firms mostly have low capabilities in general and weak absorptive capacity, in particular to identify and internalise knowledge from foreign firms or other foreign sources (Lall & Pietrobelli 2002; Morrissey 2012; UNCTAD 2013; Staritz and Frederick 2016). Therefore, in the

context of Africa, 'endogenizing' knowledge brought by FDI involves a complex process, requiring extensive efforts by local firms, as well as the support of sectoral and other institutions, which themselves may have to be created or co-produced first by a pro-active government policy as part of the very same process of endogenization: "…the progressive development of local capabilities and local control of a new export base that has initially been shaped by external factors and forces" (Melese and Helmsing 2010:36).

The GVC approach focuses on the power relations and governance in specific GVCs, which determine the prospects of local firms to enter, access knowledge, learn and upgrade in the GVC (Gereffi et al. 2005; Kaplinsky & Morris 2001). However, governance structure varies across and within GVCs having different implications on supplier firms' opportunities for upgrading and building capabilities (Schmitz 2006; Humphrey and Schmitz 2002a). Yet, whatever upgrading potential GVCs might offer, accessing it requires firms to be capable of inserting themselves into such chains, which in turn necessitates a certain level of capabilities such as a basic ability of export production. If local firms in low income countries manage to join a certain light-tech GVC, they might gain a comparative advantage because of low wages but this cannot be sustainable unless they adequately raise productivity over time alongside wages. The latter in turn requires firms to develop a higher level of organisational skills or overall technological capabilities (Coe and Yeung 2015; Khan 2018). In addition, GVC requirements are not fixed; they tend to be dynamic due to changes in technology or consumer taste. Therefore, supplier firms need to have dynamic capabilities involving continuous effort to search and learn; reconfiguring strategies to competitively respond to changing market and non-market conditions (Nelson and Winter 1982; Lall and Pietrobelli 2001). African firms largely lack the necessary capabilities to do so, which is partly the reason that they showed limited participation in the global trade and GVC (Lall et al 1994; Gibbon and Ponte 2005; UNCTAD 2013; 2016).

As the experience of advanced countries demonstrated, the process of capability building among local firms was mostly guided by industrial policies that were used to tackle market and non-market failures (Amdsen, 2001; Chang 2002; Cimoli, Dosi, & Stiglitz, 2009). With 'functional' policy interventions aiming to manage macroeconomic conditions and improve quality and accessibility of factor markets, economic development has usually involved 'selective' industrial and trade policies, involving deliberately protecting domestic market, reallocating resources away from activities with low productivity and/or low learning opportunities to sectors that have greater potential for dynamic productivity growth and linkages. Those selective or targeted industrial policies can be used to tackle the market and coordination failures that are common in low income countries. As a result, it can reduce investment barriers for local firms and enable them to participate in GVCs, expand knowledge infrastructure (for example selectively attract FDI and induce their interaction with local firms), coordinate factor markets improvement, and promote externalities and linkages.

Due to all these complexities in national and global contexts, African firms are in a sort of learning trap since they need to have relatively higher capabilities in order to identify and absorb existing technology, while at the same time they need to make risky and costly investments in order to get a certain threshold of capabilities (absorptive capacities). But, it is least likely for firms with initially low capabilities to undertake such investments, because not only do they lack the necessary resource capacity to do so but also their profitability is uncertain (Lall & Pietrobelli 2002; Lall & Narula 2004). The overall objective of the thesis is to contribute to a better understanding of how African-owned firms can get out of this learning trap. In particular, it focuses on how technology transfer occurs and how local firms learn in low-income countries, providing insights into the process of economic transformation and how that occurs in the twenty-first century. The thesis also aims to contribute to filling the gap in empirical literature by documenting the learning processes of locally owned firms.

Although the unit of analysis in this thesis is the firm, it discusses the major determining factors such as industrial policy, FDI spillover and GVC governance to the extent it is relevant in explaining their role in influencing local firms' TC building process. The thesis hypothesises that firm-level processes of capability building can only be understood by taking into account national, sector and GVC context, wherein local as well as foreign firms are embedded. Thus, the thesis raises a number of sub-questions:

1. How do initial capabilities, prior experience, and type of ownership (indigenous, immigrant, diaspora, state-owned, joint venture) shape decisions of Ethiopian-owned firms to invest in learning?

2. How do national institutions and policies concerning infrastructure, land, finance, research, and education affect individual firms' decisions to invest in learning, as well as in their learning processes?

3. How does the presence of foreign direct investment in the sector influence local firms' learning process?

4. How do sector specificity and sectoral knowledge features influence firms' investment in learning?

5. How do governance structures, production and sourcing strategies of foreign investors and end markets, in particular global value chains, shape local firms' strategies for investing in learning and their success in building capabilities?

Research design and Methodological approach

This thesis is part of a research project: 'African-owned firms building capabilities in global value chains', referred to in short as AFRICAP, which is funded by the Danish Social Sciences Research Council. The research design of this thesis is broadly informed by the project which selected the place and the sector of the study based on three criteria: export industries where FDI was present, where African-owned firms were also present and thirdly, where at least some of those firms had increased their capabilities. There are not many industries in Sub Saharan African countries fitting all these three

criteria. Based on a thorough screening of available industries, four sectors were selected: (1) Ethiopian textile/apparel, (2) Ethiopian floriculture, (3) Kenyan floriculture/horticulture and (4) Madagascar textile/apparel. The two industries—floriculture and textile/apparel—are the most prominent agroindustry and manufacturing sectors into which FDI has entered since the year 2000. Madagascar and Ethiopia are respectively the second and seventh largest apparel exporters in Sub Saharan Africa, while Kenya and Ethiopia are the first and second largest floriculture exporters in the region. Existing literature showed that there are African-owned firms present in these sectors and that some of them have been successful in building their technological capabilities. This thesis focuses on the floriculture export sector of Ethiopia, while other team members of the project examined other sectors with broadly similar research questions to contribute to similar overall objectives.

The Ethiopian floriculture export sector is considered an example of successful African industrial development (UNECA 2016). The sector, pioneered by domestic firms in the 1990s, is relatively young and yet has rapidly expanded to emerge as the fifth largest flower exporter worldwide. The industry became an important source of foreign exchange as it has generated around USD 162 million foreign exchange per annum between 2006/07 and 2014/15 and also created direct employment for over 40,000 people, of whom the majority were women. In 2016, there were 82 foreign and local firms in the sector cultivating over 1,623 hectares of land under modern greenhouses, predominantly growing roses but also summer flowers and cuttings for export market. The Netherlands is by far the major market for Ethiopian flowers as it is the destination for more than 80% the total export, while the remaining share goes to the Middle East and other Western countries.

The Ethiopian floriculture industry has received significant attention from scholars, but the existing literature does not assess the TC of local firms in the sector and their learning processes; nor did it identify the gaps in local firms' capabilities to remain competitive and upgrade in the floriculture GVC. Even though the sector is featured as a success story in a number of studies that examined the role of the Ethiopian industrial policy (Gebreeyesus 2013; Abebe and Schaefer 2015; Oqubay 2015), those comparative studies did not unpack firm-level capabilities. While Gebreeyesus compared the performance of industrial policy between various sectors in the country, the focus of Abebe and Schaefer was on the role of the targeted industrial policy. In this, they briefly assessed the capacity development program undertaken to improve local firms' knowledge gaps. Whereas, Oqubay (2015), with largely similar focus as the other two studies, pointed out the limitations of government policies targeting floriculture exports in supporting the development of local firms and their capabilities.

Bert Helmsing and I also briefly assessed local firms' capabilities, but the main focus of our study was investigating the overall development trajectory of the sector in the context of strong dominance of the Dutch - as investors, as sales channel (Dutch auction) and as development cooperation (Melese and Helmsing 2010). Although local firms' capabilities were used as one of the indicators to broadly assess

the progress of the sector, whether it leads to endogenization or might create enclave economy, the capability measures were not extensive enough, focusing on a few quantitative data drawn from small sample and it also doesn't provide an up-to-date view since the data was from 2007. Similarly, Gebreeyesus and Sonobe (2012) conducted research using census data and showed how the sector has evolved in response to an increasingly stringent GVC context.

Despite inadequate focus on capabilities of local firms, those and other studies made important contribution to advance understanding about various developmental dimensions of the Ethiopian flower sector from which this thesis draws on. For instance, the role of the export sector with regard to poverty reduction, labour and environmental conditions. The experimental study of Blattman and Dercon (2016) on occupational choice in three industries in Ethiopia, including floriculture, shows that the sector offers steady hours of work but had limited impact on income due to low wages and rising health problems. Others like Sahle and Potting (2013) and Tilahun (2012) uncovered the negative environmental impacts of the sector due to the intensive use of fertilisers, pesticides, and greenhouse plastic. Whereas other studies such as Suzuki et al. (2017) and Getahun and Villanger (2017) reported positive results of women's employment in the sector leading to higher saving and asset accumulation. However, the strategies of accumulation can be questioned as it might be reinforcing poverty and gender inequality (Melese 2019). Scholars also investigated the sector from the perspective of economic agglomeration, showing the impact of clustering in the sector contributed to knowledge flow and higher productivity (Mano and Suzuki 2010).

The Ethiopian floriculture provides an interesting setting to examine the research questions raised by the thesis since the local firms in the sector operate in the context where all major factors FDI, GVC and selective industrial policy are at play. As a result, the case study enables us to gain a deeper understanding of how and under what conditions each of those factors shape firm-level process of TC building and to produce concrete as well as generalisable knowledge (Flyvbjerg 2005; Lund 2014). The findings of the thesis significantly contribute to the understanding of TC building dynamics in other export sectors in Ethiopia, since firms in those sectors are embedded in largely similar national context with flower firms and since they share global context with overlapping features. Furthermore, the findings provide propositions or arguments to be affirmed or contradicted by other similar studies in sub-Saharan Africa and other low-income countries for its generalisability as well as an input for theory building.

Methodological approach to measuring capabilities and studying firm learning processes

Technological capabilities are hard to codify and thus difficult to measure; therefore, studies usually assess TC based on quantitative measures such as export performance and total factor productivity measures, often using aggregate data at macro or sectoral (disaggregating low-tech, medium-tech and

high-tech) levels without identifying sector-specific TC (Biggs et al 1995; Lall and Piterobelli 2002; Lall and Kraemer-Mbula 2005). More recent studies argued that it is only possible to measure 'revealed capabilities' which are the outcome of capabilities as captured in measures of productivity and product quality (Sutton 2012; Newman et al. 2016). While these scholars recognise to some extent that capabilities are industry-specific, they do not take an industry-specific approach to identifying, measuring and assessing capabilities and thus their discussion of what capabilities are required and how they affect firm performance, stays at a rather general level.

This thesis aims to move toward measuring the actual capabilities and in doing so, it builds on previous works such as Lall et al (1994), Wignaraja (2002) and Eerally and Cantwell (2011), who tried to measure sector specific TC using primarily a quantitative approach. The thesis adopts mainly qualitative approach and applies a distinct methodology that combines technological capabilities with a global value chains approach, which in turn helps to identify more precisely what kind of capabilities are required to enter and remain competitive in specific export sectors and to explain how firms learn and acquire these capabilities. In addition, the concept of upgrading in the GVC approach largely overlaps with TC functions and can be usefully combined with Lall's TC framework to advance understanding of firms' upgrading trajectories and TC building processes and to define and measure TC of supplier firms participating in specific GVCs. Although GVC literature gives less emphasis to decisions and efforts at the level of supplier firms, it examines more the characteristics and the effects of market related linkages in the contemporary global economy than the TC approach, whose relative focus is on internal dynamics and efforts of supplier firms. Therefore, as pointed out by Morrison et al (2008), combining the two approaches strengthens each other's weaknesses.

Technological capabilities literature provides a method for moving from an abstract concept to something that can be operationalised through concrete descriptions of the capabilities on demand in particular industries. Lall (1992) produced the classic conceptualisation in a matrix generated by two classificatory principles: the functions that firms need to perform and their degree of complexity. The functions that he singled out include investment, production and linkage capabilities, which he recognised can be interrelated and partly overlapping. For each category of capabilities, Lall distinguished the degree of complexity from basic to intermediate to advanced, corresponding to the following typology: simple and routine (experience based), adaptive and duplicative (search based) and innovative and risky (research based). However, in order to tailor the definition of capabilities and their complexities to the specific sector, the TC matrix is combined with GVC approach and then the kinds of capabilities the local firms are required to have in order to be able to participate and successfully compete in the floriculture GVC are identified (see Chapter 3). For this, literature review of horticulture GVC provided a starting point but the floriculture sub-sector of horticulture got limited attention in GVC literature (Keane 2012), thus apart from the existing relatively small literature, the author's own

experience in the Ethiopian floriculture sector has provided additional input in identifying the capabilities and the corresponding sets of indicators.

As discussed before, building capabilities is not only determined by firm-level factors, such as initial capabilities and ownership types of the firm, but also by mediating and influencing factors that originate from the national (macroeconomic and sector specific institutions, policies, infrastructure, services) as well as global environment (GVC governance, international regulations and agreements as well as development cooperation programs). Thus, as preliminary step, some of these factors are identified using literature review, secondary sources (internet search and documents) and personal experience. For instance, relevant institutions and policies in the national context, the dominant functions local firms are undertaking in the GVC (i.e. export production of roses and occasionally summer flowers) and the major sales channel of local firms (Dutch auction) were identified prior to fieldwork which helped to focus the scope of the literature review[2].

The thesis specifically used survey and firm histories methods. Survey method usually involved closed questions (usually quantifiable), conducted through structured interviews and often on randomly selected samples (Aldridge and Levine 2001). It is recognised as the preferred method particularly to generate data on 'who, what, where, how many, how much?' types of questions focusing on contemporary events (Yin 2009). However, despite its capacity to generate large data sets (statistically significant) from a larger number of respondents, the data tend to be limited in depth (Aldridge and Levine 2001). This thesis also applied the survey method aiming to collect a large amount of data from local firms in floriculture industry raising mainly those 'who, what, where, how many, how much?' questions but not necessarily limited to closed questions nor to contemporary events, as it occasionally included questions concerning past events as well as open-ended questions raised in an interactive manner. Alongside surveys, firm histories method has been used to examine the 'why and how' questions related to firms' investment in TC building (Wangwe 1995). In contrary to the survey method, firm histories method can be administered in smaller sample sizes to collect data with 'in-depth' meaning. It might involve fewer cases but many variables and moments in time, which is why life histories/firm histories is found to be a very useful method to uncover complex phenomena that tend to be hidden from other methods (Davis 2006). It helps to get insight about firms' path or trajectory followed over time, their background that influenced their choices, and the process through which firms acquired or lost their TC. However, both methods and the associated data collection techniques have their own strengths and weaknesses. For instance, survey and questionnaires are very deterministic and

[2] I have intermittently studied the sector since 2007 (including writing my M.A. thesis), conducted fieldwork on the Ethiopian floriculture industry in 2009, interviewing key informants to assess the overall performance of the sector in the aftermath of the financial crisis. Fieldwork was also undertaken in 2014 and 2015 for a different project that included interviewing some local and foreign firms. Although that research focused on labour and included a labour survey and life story records of flower farm workers, it touched upon general features of the firms and involved in-depth discussions with key managers, repeated visits to farms and farm observations. In developing the sector specific TC matrix, the author sometimes draws upon on this previous research.

often do not capture the broader picture. Similarly, interviews and narratives might rely on biased responses or on respondent's ability to articulate her/his experience. But the weakness can be minimised through various devises such as triangulation (Creswell 2009).

In this research, I had a unique opportunity to work in collaboration with team members of AFRICAP. The collaborative effort was particularly strong in the areas of developing research questions, the broad methodological approach as well as in TC scoring process, where I was actively involved in and led the floriculture sector side of the research project. Apart from those areas of collaboration, the rest of the research was my individual work, for example, designing fieldwork instruments (questionnaires and selected indicators), analytical framework, TC scoring table, analysing techniques and analysis. But I benefited from constructive comments and insights of the team at those various stages of the research. Despite that, being part of a project has some challenges as well, such as making sure the teamwork won't overshadow the individual contribution. In order to avoid that, I made conscious effort and remained a step ahead of the team when it came to concrete progress of the research (data collection through to analysis) provided the initial inputs that the team used in their respective studies and built up on that through team discussion.

Fieldwork planning and preparation

In the original plan of the project, the empirical investigation intended to involve a two-step process: (1) classify the local firms into groups according to success in building capabilities and (2) select a sample of firms from each group for examining how firm-specific characteristics, GVC characteristics and the national institutional environment affected those firms' decisions to invest in learning. A tentative fieldwork plan was provided by AFRICAP, but as the knowledge about the sector and context increased, I made the necessary adjustments as needed. But the thesis did follow the two-steps process and in the first step, a survey method was primarily used, while a firm history method was applied for the second step. Undertaking the first step required preparation, which mainly entailed extensive literature reviews in the floriculture GVC as well as in the Ethiopian industry, as mentioned before. Once I developed a sector specific TC matrix and identified potential indicators, I designed a survey questionnaire (see Annex-2). Furthermore, the matrix and the questionnaire have been presented in an indictors workshop where the AFRICAP project team and advisory board provided very useful inputs. This helped improving indicators and the questionnaire before finalising fieldwork instruments.

To identify the number of local firms in the industry, which was needed to determine the sample frame and survey sample, I used secondary sources such as websites of the industry association and government's lead agency and documents found via internet search and in personal archive. A total of around 119 firms were identified in the industry as producer of cuttings, summer flowers and roses, of which 34 were Ethiopian and 9 were joint ventures, while the rest were foreign or unknown. However,

it was extremely difficult to identify the precise numbers of firms and their ownership since the various sources provided different information. In addition, it was not clear whether those firms were still in operation, as I knew that many local firms had collapsed in the past years. Thus, an experienced research assistant was hired and he collected information to help identify firms in the industry and their ownership using different sources: government and sector institutions (Ethiopian investment agency, Ethiopian horticulture development agency (EHDA), Ethiopian horticulture producers and exporters association (EHPEA)). The result identified around 20 local firms, which assured the possibility of conducting census instead of sampling. In addition, the fieldwork assistant submitted the necessary official letters to relevant institutions (e.g. the sector association and lead agency) and collected the addresses of firms (their head office and farm locations).

Data collection and analysis

Fieldwork was conducted over a one-year period (June 2016 - July 2017) in Ethiopia and in the Netherlands, since the latter is the most dominant export market for Ethiopian flowers. In addition, Dutch consultants that closely worked with local firms are located in the Netherlands. The first phase of fieldwork was conducted in Ethiopia from June to July 2016; a second phase in February 2017 and a last phase in June/July 2017. The fieldwork in the Netherlands was conducted in the time between August 2016 and January 2017.

Up on arriving in Addis Ababa in June 2016, I used the information collected by the research assistant to further crosscheck and determine the exact number of local firms and identify their ownership. The thesis defines ownership of local firms considering factors beyond their official nationality that potentially create differentiated access to knowledge and other resources. Thus, four types of ownership have been identified: indigenous, diaspora, party owned and MIDROC owned. For this I got the help of the industry association and in collaboration with their project officer, we identified the existing local firms (13 locally owned, 1 joint venture) and we also tried to identify the collapsed ones (19 local firms) as far as possible. Toward the end of the fieldwork, however, two more local firms, owned by the same investor, were identified but not included in the survey.

Apart from that, meeting with the association (officers and director) was part of creating supportive ground for the fieldwork as it is the most important entry point to the sector linking with other relevant institutions and individuals and obtaining secondary data and documents. In addition, the director and a project officer were among the key informants with whom semi-structured interviews were administered. Although I had positive experience with the association in my previous work, over time the sector seems to have become less open to research due to facing increasing negative public perception, which is partly driven by rumours but sometimes supported by evidence related to ‘land

grab', utilisation of chemicals and pesticides, as well as labour conditions (Rahemato 2009; Sahle and Potting 2013; Cramer et al 2014).

Moreover, some firms were not willing to participate or were difficult to reach partly for the same reason (fearing negative perception), but also because of interview fatigue as they talked to many local and international researchers over the past years. In such cases, I used the help of more accessible firms to get the others on board for interviews. The objective of the research explained to all respondents and obtained their consent in order to ensure the ethical process of the research (DARG 2003). I also followed their convenience in terms of time and place for the interviews.

Conducting firm survey

I conducted a pilot survey with two firms, after which the questionnaire was modified. After that the survey was administered with all local firms in face-to-face interviews. Respecting the wish of respondents, voice recording has been avoided. Instead, I have taken notes especially on open-ended questions, where responses sometimes covered beyond specific questions as sequenced in the questionnaire or provided extra-explanations. So, noting as much as possible was useful, not only to save time by avoiding unnecessary repetition of questions but also to collect data hinting at 'critical events' to be traced in the next phase of fieldwork (firm histories). However, firms were reluctant to respond precisely regarding some questions. For example, regarding costs of production, price and profit. In such cases, they were asked to give estimates and average trends, i.e. the number of times they made loss, average price, minimum profit rates etc. A few firms were also reluctant to disclose their other business activities.

The questionnaire included both quantitative indicators and qualitative measures, including open-ended questions (see Annex-1). Although the questions were largely aimed at examining the conditions of the firms at the time of the survey, firms were asked about their past situations related to initial experience and investment capabilities. The questionnaire was relatively long, but not all questions were relevant for all firms. If the interviewee was pressed for time, the questionnaire indicated the 'must ask' questions in bold, which were asked in all instances in order to have a minimum base for comparability. The questionnaire was administered in 2016-2017 to the owner and/or top managers of 13 local flower firms through face-to-face interviews. In most cases, the owners were interviewed (seven of the 13 firms), and in the absence of the owner, the top managers (general managers and sometimes farm managers) were interviewed. All farm sites were visited, which allowed observation that could confirm some survey answers and additional insights about managerial and organisational set ups. More data is collected through interviews with members of management in EHPEA (the business association), EHDA (the lead agency), consultants and market actors in the Netherlands. In addition, various websites of producers, market actors and standard setting bodies were explored to triangulate data. For example, regarding

certification of firms for international standards, the websites of certification bodies were found useful to crosscheck responses of firms as well as to raise further questions.

Collecting data from various sources and using different methods helped to triangulate and improve the accuracy of the data (Olsen 2004; Sumner and Tribe 2008). Thus, the data collected using survey method was triangulated using information generated from interviews conducted with the same, as well as with different, sources through semi-structured interviews (see Annex-2). The first phase of data collection provided the necessary information to select firms for the next phase and confirmed the most important institutions and actors in Ethiopia as well as the Netherlands that needed to be included in semi-structured interviews.

Preliminary analysis of the data began simultaneously while conducting the survey by regularly going through the content of the questionnaire and the notes. The data was typed in Excel and Word documents, priorities were defined and missing or doubtful data identified. This process was followed by reformulating the capabilities categories in the sector specific matrix, considering contextual factors and selecting the appropriate indicators including both qualitative and quantitative ones. The specific indicators and scoring techniques will be discussed in Chapter 5.

Conducting firm history interviews

As the second phase of the empirical investigation, firm histories were recorded through repeated interviews conducted in three phases with firm owners and farm managers. The interviews raised 'why and how' questions starting from the time of firms' entry into the sector until the present (June 2016-July 2017). Process tracing technique has been applied which is recognised as a key technique for capturing causal mechanisms in action (George and Bennet 2005; Bennet and Checkel 2012). The theoretical hypotheses of the thesis provided the initial scope and conditions for the causal mechanisms to be traced during firm history interviews. In other words, the process tracing focused on firm-specific characteristics, GVC characteristics, FDI and the national institutional environment in relation to firms' decisions and TC building. At the same time, room was left to uncover 'new' dynamics and relations that drive firms' investment in learning, as is common in process tracing technique where there is iteration between the inductive and deductive sides of the research (Ibid).

The strategy adopted to select firms was to capture variation among relevant dimensions. Some of those dimensions were initially planned, such as TC performance and type of local ownership, but other complexities were added as revealed by the survey. In this regard, variation in export trajectories for example has also been included and presented in detail in Chapters 5 and 6. Originally the sample consisted of eight firms, but as the work progressed, some firms were replaced by others and/or additional firms were included based on availability and willingness of firms. Of the 13 firms surveyed,

10 of them have participated in the firm histories but with some variation in terms of depth. Guiding questions were prepared for interviews.

The first phase of firm history was right after the survey (June-July 2016) and it involved interviews with owners, in some cases general managers and farm managers, taking about 1 to 3 hours in one or two interviews. Some relevant foreign firms and institutional actors were also interviewed.

In the second phase (Oct-Nov 2016) interviews were conducted with market actors at the Dutch auction (unpackers and online traders) and a Dutch consultant who is affiliated with CBI and intermittently provided training to local firms since 2009 until 2017 under Ethio-Dutch partnership programs[3]. These interviews provided a closer view of all the local firms and some of the issues were taken up to the third phase and were raised with firms for further clarification and for crosschecking. For example, about their market performance, trends and the training they received from market actors and consultants. In this phase owners and farm managers were interviewed for the second or third time. In addition, experienced farm managers, foreign firms and institutions were interviewed. The aim of this phase was to clarify, crosscheck and fill data gaps related to the firms interviewed in the first two phases and collect more data on collapsed firms.

Collecting data from several sources had two purposes. Firstly, to collect the necessary information from primary sources. For example, the industry association was interviewed about their general services to and their relations with local firms and market actors (unpackers and online-traders) were asked about the market performance of each local firm. The other purpose was for triangulation. Sometimes firms provide wrong or biased information due to imperfect memory of the past events or having potential motives to respond in a certain way. In many cases the reliability of the data can be improved through the careful use of triangulation, both across different persons and between different kinds of sources (Beach and Pedersen 2013). For instance, both owners and unpackers were asked about average price the firm obtained at the auction; while all firm owners tended to tell a similar average price, the unpacker firm at the Dutch auction was able to rank them. Similarly, both farm managers and owners were asked about labour conditions (wage, contract, job benefits) and only conditions that matched were considered in assessing the firms. Moreover, export data was collected from firms, but firms are reluctant to give actual data, so the same data is collected from government agency (EHDA) which is a bit understated in comparison to the firms' estimation but considered as more reliable in measuring firms' performance.

As an Ethiopian, I had the advantage of being the 'insider' that speaks the same language as the respondents and broadly shares similar economic, social and cultural background which helped to reduce data loss/misunderstanding arising from translation. In addition, as a 'local' person who follows local newsletters and regularly communicates with the people on the ground, I could find out certain

[3] CBI is part of the Dutch enterprise agency funded by the Dutch ministry of foreign affairs.

information about local firms relatively easily, for instance, with regard to the background of firm owners/family business, entrepreneurial history and possible relations with political power. However, being an 'insider' has its own potential risk of reflecting one's own bias on the research (Sumner and Tribe 2008). Thus, I took precautions, and regularly made self-scrutiny on my positionality and questioned the knowledge generated by the research.

Preparation for conducting the firm history interviews and the preliminary analysis was done iteratively. After the firms were selected for firm history interviews, they were categorised chronologically based on the year of entry into the sector. Then, major sector related external factors (national and global) that prevailed at certain periods were identified, such as major sales channels, FDI presence/absence, industrial policy, industry association etc. Each firm/case was mapped in periods: i) local firm entered the sector during initial experimentation before the arrival of the first FDI and the introduction of sector specific policies (industrial policy) which was roughly in early 1990s, ii) local firm that entered the sector soon after the arrival of the first FDI and the industrial policy (1999-2003), iii) local firm that entered during the take-off or boom of the sector (2004-6), and iv) local firm that joined the sector during its maturity which approximately began around 2007. This classification of firms and identifying key events was found to be useful to systematically organise the interviews as well as structure firm narratives while helping to illuminate the impact of factors playing at various levels (firm to global) in firms' investment in learning.

Certain key issues were selected as critical events in the sector (e.g. global financial crisis, the merger of Dutch auction houses, the death of Prime Minister Meles who was the key promotor of the sector) and in specific firms (e.g. loss-making years, cultivation expansion/lack of it, international standards, diversifying sales channel, labour turnover, etc). Moreover, the survey result helped to highlight 'observable manifestations' of existing causal mechanisms (Beach and Pedersen 2013), which was further unpacked in applying the firm history method. For example, the survey indicated whether the firm did have an international business certificate or not, which gives traces of evidence in relation to GVC characteristics and firms' investment in learning. Therefore, during interviews, firms were asked why they did (not) adopt it and were asked about its impact on their capabilities related to production as well as marketing level.

During interviews, the dynamic situation of those national and global factors (their presence, absence, change) and their causality with firms TC building was traced. In addition, questions related to critical events were used to understand the response of firms whether it led to gaining new function/upgrading, changing market strategy, downgrading, etc. Furthermore, they indicated whether the firm exhibited unique ways of managing business, its degree of flexibility in dealing with changing environments and whether the management of the firm had a vision and commitment to the export business.

Structure and main findings of the thesis

This thesis consists of eight chapters. The objective of the next chapter (**Chapter 2**) is to present the analytical framework of the thesis that is constructed based on several concepts drawing on separate but related bodies of literature. The technological capabilities approach is the central concept employed and complemented by GVC approach and other relevant literature such as national innovation systems, clusters FDI and industrial policy. The technological capabilities approach explains the defining features and processes of acquiring TC, while indicating important firm specific characteristics that determine processes of TC building. The chapter also discusses the major external factors (industrial policy and systems of innovation, FDI spillovers, as well as GVC governance) and the associated key mechanisms that shape firms' investment in learning and it details the complex interaction among the factors that shape firm-level processes. Furthermore, the chapter discusses the functional categories of TC (investment, production and linkage) and their different level of complexities as conceptualised in Lall's TC matrix and the concept of upgrading in GVC approach. By combining TC and upgrading concepts, the chapter creates a sector specific matrix that can be applied to measure local firms' TC in the context floriculture GVCs.

Chapter 3 intends to understand specifically how floriculture GVC dynamics influence firm-level TC building processes and to highlight what capabilities supplier firms need to have in order to participate in the GVC. The chapter presents, based on existing literature but also on the empirical material of this thesis (specifically, the firm survey and interviews with market actors in the Dutch auction), the floriculture global value chains and major players focusing on market features, governance structures and diverse upgrading paths in the most dominant GVC nodes where most low-income countries and firms, including Ethiopian-owned flower firms, are inserted in. Furthermore, building on this discussion and the matrix introduced in Chapter 2, the chapter presents a sector specific TC and upgrading matrix.

The objective of **Chapter 4** is to examine the national context and the specific factors that influenced the emergence and development of the Ethiopian floriculture industry and locally owned flower firms. It does so by way of providing the evolution of the export sector, roughly divided in five phases: initial experiment, early movers, take-off, maturity and consolidation/stagnation. The chapter shows that the industry association, the government and Dutch official development cooperation are the main drivers behind the development of the sector**. Chapter 5** measures and analyses the technological capabilities of the Ethiopian-owned firms. In the absence of existing literature that showed the specific capabilities of local firms, this step is considered as a precondition to understanding the factors that influence the process of local firms' TC building. The chapter uses the floriculture GVC matrix developed in Chapter 3 to assess the TC of local firms focusing on four functions: investment, production, linkage and end market capabilities. The aggregate capabilities score of the 11 firms indicates an uneven process of TC building in which five firms built the capabilities to the level of medium and above, four firms appear slightly below medium (med-minus) while two firms show a rather low score.

Chapter 6 aims to understand why individual Ethiopian-owned floriculture firms invested in learning based on firm history narratives. It also further unpacks the dynamics behind firms' static aggregate capability scores presented in Chapter 5. The individual firm narratives are presented by classifying firms in three groups: the first group entails *pioneer and early mover firms.* Pioneers refer to firms that entered the sector in 1990s during initial experimentation, before the arrival of foreign firms and the targeted industrial policy. Early movers refer to firms that entered the sector soon after the entry of the first foreign firm and the launch of the industrial policy, which was around 2000-2003. The second group includes *firms at the take-off phase* of the industry which was around 2004-6; and the third group consists of firms that entered *at and after maturity phase* which means around 2007-8 until 2016.

Chapter 7 aims to address the research questions of the thesis by taking a broader view of all the empirical chapters, particularly at the individual firm narratives. It explains how industrial policy, the national innovation systems, FDI spillovers, GVC governance as well as firm specific issues influenced local firms' investment and learning efforts in the Ethiopian floriculture export sector leading to their specific TC levels. The chapter discusses factors that drove the collapse of local firms, the factors behind firms' effort to survive as well as to build their capabilities to divergent levels. Firms' initial investment in the export sector was mainly incentivised by government industrial policy, while a Dutch development program played an important but less prominent role. Systems of innovation, FDI spillovers, GVC governance, and the Dutch development program served as sources of knowledge and catalysed learning to various degrees. Nevertheless, firms' learning efforts were influenced initially by sector specific characteristics, but their further efforts and subsequent level of their technological capabilities was driven mainly by firm-specific characteristics.

Chapter 8 summarises the contribution of the thesis. The key contribution is that the thesis moves a step forward from the literature and make a conceptual distinction about firms' TC building process by breaking the TC process into the three dimensions: initial investment, source of knowledge and learning effort. The distinction facilitates simplifying the complex process and shows specifically how each factor mattered in shaping each dimension. In addition to confirming with the literature about the major factors that shape firms' investment in learning, the thesis uncovers new factors such as diversified business groups (firm specific characteristics) and a Dutch development program playing key role. The latter factor shows alignment of economic interest between the lead firm in the GVC (the Dutch auction) and the Dutch state which might have driven the large support provided to the sector for a rather long period, but such lead firm-state strategic alignment has not received consideration in the literature.

Furthermore, Chapter 8 also discusses the contribution of the thesis in terms of elaborating FDI, national innovation system and GVC literature. In the case of the latter, the empirical evidence shows that the links between governance types and learning mechanisms are more complex than assumed in literature. In addition, governance at specific node of a GVC may not be fully captured by the characteristics of a

single governance type because inter-firm relations at a certain node might have overlapping features that describe more than one of five governance types identified in GVC literature. In relation to innovation systems, the thesis emphasises a relatively less emphasised issue in the literature, which is the role of coordination in innovation systems. Clear coordination supported by deliberate policies is key in creating and sustaining systemic-ness, especially in low-income countries where market imperfection is prevalent and private initiatives and national institutions are weak. Regarding FDI, based on the knowledge flow between Kenya and Ethiopia, which shows the indirect FDI spillovers, the thesis underpins the importance of expanding the debate regarding FDI spillover channels to include regional dynamics. The chapter also discusses the success and failures of the industrial policy of Ethiopian floriculture sector as lessons for policy makers in Ethiopia and other African as well as other low-income countries. Industrial policies need to be more future looking (sustainable) rather than addressing short-term problems. The industrial policy of Ethiopian floriculture, despite having some future looking aspects, seems to be largely driven by short-term challenges and the policy is not adequately redesigned to make it more future looking.

2. Analytical framework: understanding Ethiopian-owned firms' investment in learning

2.1. Introduction

This chapter presents the main literature review conducted in order to understand to what extent the existing literature addressed the questions raised in this thesis and what theoretical framework was used in those works. Although several bodies of literature separately deal with some of the research questions, they generally do not reference each other and thus don't provide a comprehensive framework that can help fully answer the research questions. Therefore, one of the challenges of this thesis was to construct a theoretical framework drawing on several strands of literature as presented in this chapter. While technological capability is the central approach of the thesis, it is complemented by other concepts mainly from global value chain approach, national innovation systems, foreign direct investment and industrial policy literature. In doing so, the thesis shows the benefits of drawing separate but related bodies of literature to construct a more comprehensive and deeper empirical investigation.

The first part of the chapter presents the technological capabilities approach in such ways that defines the key concepts in the research questions and how the meaning and the workings of technology are understood in this thesis. It also explains how firms absorb, master and accumulate technology through deliberate effort or investment, while highlighting the difficulties in doing so, particularly in the context of low income countries. The approach was found very useful in understanding of firms' internal dynamics in relation to TC building process as well as the interactive nature of the process with external environment. However, the approach does not systematically distinguish the external factors that make it easier for analytical application. Moreover, technological capabilities approach doesn't adequately consider the contemporary trends of global economic restructuring in relation to what is required from exporters of low-income countries in securing a competitive edge and it can be usefully combined with GVC approach in order to strengthen both approaches (Morrison et al 2008). Therefore, the second part of the chapter presents key external factors and identifies their potential mechanisms through which they influence firms' TC building process. They are discussed under three categories: national setting (policies and systems of innovation), FDI spillover and GVC governance.

The fourth part of the chapter concretely defines firm-level TC, based on the technological capabilities approach that goes a step further from the abstract concept of capabilities and identify key categories of TC (investment, production and linkage capabilities), which in turn enable operationalisation of the concept for empirical investigation. This is mainly based on the classic work of Lall (1992) and his TC matrix. Furthermore, the fourth section shows how the concept of upgrading is closely related with TC and it can usefully be combined with Lall's TC matrix. Lastly, the chapter presents a matrix that combines Lall's TC and an upgrading of GVC approach that is used in this thesis to identify sector

specific TC and show that it can be made sector specific. Before concluding, the chapter pulls out the key external factors and their mechanisms and briefly reiterate how they shape the firms TC building/ upgrading process. The last section of the chapter presents concluding remarks.

2.2. Technological capabilities approach

There is broad agreement in the literature regarding the centrality of technology in economic development but understanding of its meaning and workings can sharply differ depending on the theoretical perspective one uses to view and analyse technology. In the early days (1960s), the so-called 'textbook' approach appeared to influence the understanding of technology which widely viewed it as capital goods or machinery-embodied knowledge, disembodied technology such blueprints and designs which can be codified, stored and can be readily transferable through market mechanism. Such understanding is usually associated with the neoclassical perspective, which assumes that there is full knowledge about all available technologies amongst all countries and firms (Lall 1993; Pietrobelli 1998; Evenson and Westphal 1995). Therefore, acquiring technology is perceived to be a matter of choosing the right one 'off-the-shelf' based on their production function. In this approach, technology acquisition is not seen as risky investment, since inputs and outputs are assumed to be fully understood and optimal efficiency can be achieved through passive 'learning by doing'; meaning as an automatic by-product of production experience requiring little learning effort.

However, advocates of technological capabilities approach dismissed such perspective as misleading and never supported by the real-world experience. As Lall and Pieterobelli (2001:6-7) argued "*if* technology were transferable like a physical product (that is, embodied in equipment, patents and blueprints), then indeed no further learning or capabilities would be called for—getting price right would ensure that developing countries optimized their technological choice and use. Industrial capacity (the physical plant) becomes equivalent to industrial capabilities". Therefore, technological capabilities approach draws on evolutionary economic theories, pioneered by Nelson and Winter (1982) which acknowledges the fact that technology acquisition is far more complex and demanding. As there are no fully understood set of technological choices, acquiring it necessarily involves purposive learning, learning effort or technological effort—using existing knowledge stock and other resources in order to assimilate existing and/or new technologies (Dahlman and Westphal 1982). More importantly, technology involves a bundle of tacit knowledge which may not be consciously known, let alone readily transferrable since they are highly specific to a particular activities and contexts and therefore they can only be acquired through technological effort in the specific activity and context (Bell and Pavitt 1995).

Drawing on Lall (1993:722) and Bell (2007: iv), in this thesis technological capabilities (TC) are defined as firm specific knowledge assets embodied in people and organisational structures that are concerned

with both ongoing production and innovation[4]. Technological capabilities are the skills, technical knowledge and organisational coherence needed to make industrial technologies function in an enterprise. TC are not the technology embodied in capital goods, patents or manuals, nor are they educational qualifications possessed by the employees. But these are the 'raw materials' with which capabilities are put to work and a receptive base for the acquisition of capabilities determined. Scholars like Khan (2018) differentiate between codified knowledge, skills (practical know-how) and organisational capabilities which can be considered as classification of knowledge that goes in TC as defined above. Khan explains that organisational capabilities are the core knowledge that enables the use of the other two types of knowledge profitably, but they are the least recognised in the literature.

Opening the black box of firm, Nelson and Winter (1982) explained firms' behaviour in such a way that it facilitated understanding of the process of technological change and TC building by emphasising learning as key in the process, which involves search and selection in the context of uncertainties. According to the evolutionary school of thought, technological change is viewed as a knowledge centred, an open-ended and path-dependent process where no optimal solution to technical, managerial or organisational problems can be identified (Edquist 1997:6). Technological change involves considerable randomness, yet firms' behaviour can be explained by their routines (rather regular and predictable behavioural patterns of firms). Routines are capabilities developed over time usually through incremental steps, trial and error, through interactions with external environment (Nelson and Winter 1982; Nubler 2014). Through routinizations of activities, a firm develops specific knowledge (articulable and tacit knowledge) that determine on-going production and innovation. Routines are not an individual's ability, but the skills of an organisation and they are 'carriers of collective competences' within a firm (Nelson and Winter 1982:124; Nubler 2014: 127). Therefore, building effective routines or capabilities requires involving the whole firm, to be accessible to all members and fostering interactions of processes emerging from various functional departments of a firm, alongside interacting with the external environment (Lall and Piterobelli 2001).

Routines tend to be self-sustaining and do not easily change unless a bottleneck occurs which couldn't be solved by standard responses; for instance, new competition, change in buyers' requirement, consumer taste and/or government policy can trigger change in routines. Even then, organisations such as firms are generally averse to radical change and therefore they initially try to solve problems through 'local search' (Lundvall 2016) by primarily drawing on already existing and well-tested routines in and around them (in terms of products, processes, markets, etc.). This means that initial capabilities of firms and experience available within and around them (e.g. the experience of other firms; national innovation systems) matters in terms of problem solving and hence in developing capabilities. But the search and selection process of firms to solve problems can also involve 'exploratory learning' such as formal R&D

[4] Innovation refers to activities (product, process, managerial and organisational) that are new to the world, but also the ones new to a country or new to a firm (Bell 2007).

leading to refining existing routines, launching new ways of managing information and people or building new capabilities (Lall 1993a). In general, the inputs that get into firms' TC building process are internal as well as external to a firm. Inputs like capital goods, codified knowledge (manuals, blueprints) and skilled labour can be acquired from external sources (market), whereas, there are essentially internal inputs that needs to be developed through firms' technological effort or learning effort such as search, training and experimentation (Lall et al 1994; Khan 2013). Therefore, developing routines and capabilities is the result of acquiring the two types of inputs, which is an interactive process: the internal effort is affected by the external inputs and the ability to search for, acquire and utilise external inputs is affected by the nature and the extent of internal efforts (Lall et al 1994).

The degree of uncertainties and difficulty of acquiring TC varies depending on the characteristics of firms, the novelty of the technology relative to firms' existing stock of knowledge (knowledge gap) and the support that firms can draw upon from the external environment (Lall and Pietrobelli 2001; UNCTAD 2006). The characteristics of firms primarily refers to initial experience and capabilities of the firms as these define firms' locus of search and influence their learning ability as well as their decision to invest in learning. Firms with higher initial capabilities can have better understanding of cost and benefits of learning and are more likely to become competitive. These characteristics of firms' shape, for example, how firms respond to the market pressure or interact with their national setting. In general, there is no single recipe of 'search and selection' that all firms apply to solve the same problem, even if they do, the tacitness of knowledge creates variation. In addition, the type of ownership matters. 'Imported' domestic capitalists (settler colonies), and diaspora linkages have played an important role historically (Morris & Staritz 2014), as well as governments directly engaging in the process of learning through state-owned firms (Whitfield et al. 2015). Diaspora and immigrant owned firms have cultural networks that facilitate access to information, finance, export markets and inputs, and state-owned firms can afford to 'buy-in' experience through hiring foreign managers and may be compelled to learn by government pressure.

The level of difficulty and uncertainties in building TC also varies depending on the technology and specific functions undertaken within it. The learning process can be long and uncertain for complex technology/ functions; hence the more complex the technology involved and the more advanced functions undertaken, the more difficult it is for a newcomer to master the capabilities (absorption, deployment and subsequent upgrading). For instance, floriculture or apparel export production is a low technology sector involving lower learning cost, compared to auto or chemical industry which require huge investment and absorbing more complex knowledge. Nevertheless, even simplest products, given their exposure to international competition, can require fairly complex organisational capabilities (Khan 2018). Finding the 'right' technology and using it at competitive levels of efficiency always involves costly and risky efforts such as search, experimentation, induction of new information and learning. Doing so is essential to reach even 'static efficiency' (to be able to put machineries into operation or run

production without reaching competitive levels of efficiency). Since the latter also involves a certain level of selection and acquisition of appropriate knowledge and adapting it to local conditions such as climate, scales of production, worker skills and raw materials. But any of such processes cannot be fully predictable and the dynamic nature of the world requires 'dynamic capabilities' which involves continuous search and learn. Hence, technological efforts are necessary at various levels and units: from shop-floor and quality control to product design and process and engineering, from procurement to marketing and R&D, etc. In addition, through strategic management these functions need to be adapted, integrated and reconfigured to competitively respond to changing market and non-market conditions (Lall and Pietrobelli 2001; Teece and Pisano 1998).

As indicated above, firms don't learn in isolation, rather through continuous interaction with external environment. Like any other investment, firms' investment in learning is sensitive to external incentives thus can be significantly shaped by the macroeconomic conditions they are operating in (Lall 1993a). Moreover, building TC, regardless of the level of initial capabilities of firm and complexities of the technology, is far more difficult and risky process in environments where there are widespread market and institutional failures since it pushes uncertainties and learning costs up, which in turn makes investment in learning unviable, as it usually involves financing loss making periods (Khan 2009). Unfortunately, such an environment is common in low income countries such as sub-Saharan Africa and that is partly why local firms are usually technologically weak and have limited absorptive capacity, which is a subset of technological capabilities that determines firms' ability to identify and internalise knowledge that is external to them (Narula 2004). This includes a learning capability, as many firms in such contexts may need to 'learn to learn' and 'learning how to learn' since they tend to lack experience of operating in knowledge-based industries (Stiglitz 1987). On top of that, the effect of the neoclassical discourse which has been dominant in many low-income countries, particularly in sub-Sharan Africa, seem to understate the importance of technological effort and learning in the context of using and changing existing technologies (Biggs et al 1995).

In general, firms' ability and willingness to build their TC, particularly in low-income countries, is determined by several factors, which can be classified into three largely overlapping categories: incentive environment, 'supply' factors (factor market) and institutions (Lall 1992; Lall et al 1994). The incentive environment is assumed to determine the 'demand' side of TC building and it might be internal (for example, firms' inherent need to get into production and commercially succeed) as well as external such as market and policies. But the internal incentives are less likely to lead to firms' sustained learning effort and upgrading to the level needed for international competitiveness. The latter often arises from external incentive environment such as growth prospect of a major market, trade and industrial policies (Ibid). The second category or 'supply' factors is assumed to constitute the building blocks for TC that is acquired from external sources such as finance, skills, information and knowledge; and the last group

refers to institutions composing 'the rules of the game' which include policies that create as well as the organisations that support the functioning of the market for the 'supply' factors mentioned above.

2.3. External factors shaping firms' investment in learning

Technological capabilities approach explicitly acknowledges the importance of the external environment in determining TC building process of firms and those external factors are quite broad, since knowledge structure in a specific context is shaped not only by firms, production systems and formal institutions, but also by socially provided belief systems (e.g. ideologies, philosophies, religions) that significantly influence attitudes, values, preferences and work ethics (Nubler 2014). Firms are embedded in their immediate national context where economic, social and political factors interact and provide a system within which firms learn and upgrade their TC that enable them to compete in global export markets. Furthermore, the national systems that embed firms, as well as firms themselves, interact with global actors and institutions which in turn directly or indirectly influence firms' TC building through shaping the incentive environment, the factor markets and institutions. Acknowledging these broad issues, this thesis focuses on the most dominant factors that determine learning and TC building. To this end, I primarily draw on several complementary bodies of literature, such as technological capabilities approach, national innovation systems, global value chains, international business or FDI and industrial policy. The major external factors are presented below under three categories: national setting (industrial policies and systems of innovation), FDI spillover, and GVC governance.

2.3.1. National settings: Policies and Systems of innovation

Industrial policy*:* Industrial policy is the most important instrument that countries use to tackle market and non-market failures. There is no generally agreed definition of industrial policy, but this thesis applies Chang's definition (2009: 2) that industrial policy is "…a policy that deliberately favours particular industries over others, against market signals, usually (but not necessarily) to enhance efficiency and promote productivity growth". The degree of economic openness, macroeconomic management (especially related to inflation and balance of payment, foreign exchange rate) and political stability of a specific country, influence firms' motivation to invest in knowledge-based assets but it is usually not a sufficient condition to trigger more of such investments and sustain them. This is because factors that constrain investment and learning, particularly in low-income countries, are much broader than macroeconomic management as often argued in the (neo-)liberal approach. In the past decade, however, the limitations of (neo-)liberal development approaches have become more obvious, as the global narrative in development economics has been (re-)shifting to a more structuralist approach, acknowledging the critical role of industrial policy and active state intervention for economic development (Chang 2002, Stiglitz, Lin, and Monga 2013; Noman and Stiglitz 2015). Apart from

countering the Washington consensus narrative, a central part of this literature highlighted the importance of learning policies and related constraints and opportunities for low-income countries with particular focus on Africa's industrialisation (Newman et al. 2016; UNCTAD 2016).

The discussion in that literature shows that, in addition to 'functional' policy interventions aiming to improving quality and accessibility of factor markets that are presumed to be equally desirable for all (e.g. education, health, basic infrastructure etc), economic transformation usually requires 'selective' industrial policy that enable purposively reallocating resources away from activities with low productivity and/or low learning opportunities to sectors that have greater potential for dynamic productivity growth and linkages. Those selective industrial policy can be used to tackle investment barriers of local firms, lower their learning costs, coordinate factor markets improvement, promote externalities and linkages (Lall 1993; Amsden 2001; UNCTAD-UNIDO 2011).

Industrial policy can support TC building of firms through creating incentives in the environment. This usually involves provision of financial and non-financial incentives to specific sectors that can lower the risk for local firms and improve their access to knowledge. However, provision of incentives might enable firms to make capital investment, hire experts and skilled labour but doesn't necessarily lead to firms' capability building, since the latter requires learning effort. Thus, policy interventions need to include effective 'carrot and stick' approaches or 'reciprocal control mechanisms' to ensure the proper utilisation of incentives and create compulsion on firms to make learning efforts (Rodrik 2008; Amdsen 2001; Khan 2016). However, this is a difficult process as the design and implementations of industrial policy is characterised by knowledge as well as political related problems. There are no 'one fits all' polices as problems and priorities differ across countries and it is not known upfront which policies work best in a specific context, thus, successful policy design and implementation is like 'a process of discovery' which requires learning and building capabilities by policy makers, implementation and enforcement agencies (Rodrik 2008; Cimoli et al 2009). Apart from the capabilities of those agencies, the outcome of industrial policy is shaped by 'the political settlement' which defines the distribution of organisational and bargaining power across economic, political and bureaucratic organisation in a given society (Khan; 2013; 2016). For instance, certain individuals or firms might be too powerful to be disciplined by the allocating and enforcing organisations, regardless of their performance required to access incentives. This indicates the political settlement in the specific country determines the likelihood of policies to be implemented or distorted. So designing industrial policy needs to take into account not only the knowledge gap they intend to bridge but the given political settlement and whether it is conducive to effectively implement those policies.

In sum, considering both knowledge and political related challenges, industrial policy is a difficult task that needs strong political commitment, competent bureaucrats and careful design process. As it is difficult to know *ex-ante* what works best, it is more important to specify the process of designing

industrial policy than specifying its output (Rodrik 2004; 2008). The author highlights the cruciality of *strategic collaboration and coordination* between public and private sectors for deliberative process to identify major constraints, to design effective interventions and evaluate outcomes and learn from the process. In addition to getting the relationship between business and bureaucrats right, developing 'carrots and sticks' to incentivise and monitor the business, effective industrial policy requires monitoring the bureaucrats as well. "Industrial policies need to be viewed by society at large as part of a growth strategy that is geared to expand opportunities for all, rather than as giveaways to already privileged sections of the economy" (Rodrik 2004:20). Thus, making industrial policy responsive to the public helps to discipline the bureaucrats as well as to gain legitimacy.

Alongside directly allocating incentives to firms, industrial policy (directly or indirectly) shapes institutional technology and systemic factors such as systems of innovation, as well as other external factors such as FDI spillovers, which are considered crucial in determining local firms' TC building. This will be highlighted as the factors are individually discussed below.

Systems of innovation[5]: The concept is also known as national innovation systems is developed by scholars such as Lundvall (1992), Nelson (1993) and Edquist (1997) and closely related to technological capabilities approach and it perceives knowledge as being the most important resource to achieve economic development while learning is considered the most important process (Lundvall 2007). Innovation systems approach reconceptualises firms and other actors as learning organisation embedded in a given institutional context and underlines the networking of individuals, firms and organisations whose interaction promote the innovative performance of firms (Mytelka 2007; Oyelaran-Oyeyinka and McCormick 2007). The elements that constitute systems of innovation can be quite broad, comprising all economic, social, political, organisational, institutional, and other factors that influence the development, diffusion, absorption and use of innovations (Edquist 2005). According to Lundvall (2007), since firms are at the core of systems of innovation, the main components of the system can be better identified through uncovering important actors and institutions with which firms interact to acquire knowledge. Nevertheless, Edquist proposes a generic list of key activities or components that constitute systems of innovation focusing on organisations and institutions that can provide knowledge inputs to TC development innovation as well as support services for innovating firms such as R&D, competence building (education and training in school and production settings etc), articulating of demand side requirements, polices (intellectual property rights, tax laws, etc.), consultancy services and so on. However, as Oyelaran-Oyeyinka and McCormick (2007) showed, systems of innovation do not rely only on formal policies and organisations but also use informal institutions and structures to foster interaction and learning from various actors in the system.

[5] In the thesis, systems of innovation, innovation systems and national innovation systems are used interchangeably.

Although the national innovation approach is broadly used in the context of advanced countries, scholars have been increasingly using it in the context of developing and low-income countries (Adeoti 2002; World Bank 2006; Oyelaran-Oyeyinka and McCormick 2007; Pietrobelli and Rabellotti 2011). Lall and Pieterobelli (2001) applied the concept using slightly variant name 'national technology system' to study Saharan African countries (Kenya, Tanzania, Uganda, Ghana and Zimbabwe). They focused on selective knowledge infrastructure and institutions that they considered most important for advancing TC building, considering the specific development stage of the countries and where all forms of technological effort, other than frontier innovation, was assumed important. In such context, alongside the macroeconomic management and physical infrastructure, the authors highlighted the greater importance of technology institutions (or knowledge infrastructure) and technology policies[6].

The systems of innovation (national technology systems) of Lall and Pieterobelli (2001) include a largely similar list to the one proposed by Edquist (2005): from formal education and training, public and university research to firm-based human resource development and skill formation (e.g. training, experimentation especially in engineering and design skills), and from compliance and technical extension support to major international linkages and collaborations. A literate and trainable work force is essential for any development and can be achieved through expanding (in both quality and quantity terms) primary and secondary education but industrial competitiveness necessarily requires higher levels of technical skills (tertiary level education), research and services that enhance diffusion as well as absorption of technologies. Apart from improving the generic formal education and training (which is necessary to create an easily trainable workforce), accumulating selective industrial skill formation is key and largely sector specific. For instance, production supervision, process and product technology, industrial engineering, design and development can all be accumulated within sector specific efforts (Lall and Pieterobelli 2001; Bell 2007). Nevertheless, the mere presence of technology institutions such as public and university research, is not enough to enhance technological upgrading of firms, rather their interaction with industries and co-evolution with their changing needs is essential (Adeoti 2002). For instance, drawing on Nigerian context, the author indicated that in low income countries, technology and innovation are viewed as linear rather than systemic and as a result, universities and research institution tend to operate parallel to firms/industries without interactions, hence making limited contribution to TC building and industrial upgrading.

In low income countries, knowledge infrastructure such as metrology, standards, testing and quality are crucial to enhancing knowledge diffusion, while quality control and certification ultimately raise standards of a specific industry to an internationally competitive level. Such knowledge infrastructure can also provide technical extension services, specialised (sector specific) training but also knowledge

[6]According to Keith Smith (1997) knowledge infrastructure are indivisible, multi-user and generic which includes public research institutes, universities research, laboratories, training systems, organisations related to the managing of intellectual property rights, libraries, etc. This thesis may use technology institutions and knowledge infrastructure interchangeably.

intensive (technical, organisational) consultancy services (Ibid; Pietrobelli and Rabellotti 2011). These technology institutions provide a solid and long-term knowledge base to local firms and they can be established and run by any actors such as government, business associations, NGOs or in partnerships between actors (World Bank 2006). But as they may not be profitable in the short run, the knowledge infrastructures are less likely to be attractive (especially public research) for private sector so government needs to ensure their establishment.

Cluster approach helps to clarify how some of these sector specific technology infrastructures can be provided by collective actions of firms. The concept of cluster is closely connected to technological capabilities approach and systems of innovation which can be defined as a sectoral and geographical agglomeration of small firms (Schmitz 1995). As highlighted in Oyelaran-Oyeyinka and McCormick (2007), the concept of cluster significantly overlaps with national innovation systems, as they both have geographic and spatial dimensions in addition to being systemic in nature and both rely on institutions as sources of dynamism. Firms' TC building process is embedded in both systems of innovation and cluster dynamics and in fact the debate about clustering began following the argument that firms don't build TC and innovate in isolation but substantially depend on external knowledge. Thus, firms located in close geographical proximity tend to enjoy certain advantages over firms located in isolation. Although all clusters cannot be considered systems of innovation, they can become one or provide a basis for development of national innovation systems (Ibid; Bell and Albu 1999; Fransen and Helmsing 2017). Therefore, concepts in cluster approach that are found relevant for this thesis are treated as part of innovation systems.

Firms located in clusters can enjoy some advantages because of their mere location within a cluster (for example, knowledge externalities), which is often referred as 'passive' collective efficiency, while active collective efficiency arises from 'joint actions' (Schmitz 1995; Nadvi 1996). The cluster approach emphasises vertical and horizontal relations and collective learning. The vertical relations are mainly concerned with backward and forward linkages in supply chains, while the horizontal relations are about inter-firm relations between competitors and other peer groups in the same sector. However, their competition does not exclude cooperation and joint actions for solving specific problems, especially in the so-called 'pre-competitive' areas such as sector specific business services and knowledge infrastructures mentioned above (for example, metrology, standards, testing and quality) can be provided by industry association.

Apart from creating formal technological infrastructures, industrial clusters foster collective learning through easing firms' search as they create a conducive environment for better knowledge flow and provide tasted routines (Helmsing 2001). They also promote sector specific skill formation inside firms as it tends to generate a dense pool of workers with sector specific knowledge. Altogether, it tends to lead to improved collective efficiency and collective learning among small and medium size firms as

well as generating knowledge networks. However, studies have shown that firms in the same clusters don't have homogenised relationships, rather, the joint actions and collective learning in clusters can be selective or exclusive; for various reasons, including difference in firm size, technology and other cognitive factors (Giuliani and Bell 2005; Giuliani et al 2005; Oyelaran-Oyeyinka and McCormick 2007).

The creation and development of technology institutions and their interactions with industries and firms is significantly determined by technological policies that constitute the second element of national innovation systems (Lall and Pietrobelli 2002). These policies refer to incentives designed to induce firms to demand technologies and invest in local R&D, experimentation and on-the-job training. For instance, Bell (2007) argues that effective technology policies need to aim to incentivise firms to invest in internal training to improve on-going operation as well as to deepen their design and engineering capabilities. Furthermore, technology policies define which technology to develop through importing, and licensing technologies as well as encouraging FDI, especially the latter is considered a vital source of knowledge in a broad range of international business literature. But as Lall (1993b) underlined, there are several stages between the import of technology and the development of local capabilities; implying that the process is not automatic but conditioned by many factors and the major ones are discussed in the following section.

2.3.2. Foreign direct investment spillovers

Foreign direct investment (FDI) is considered as important source of knowledge that low-income countries can use to access 'new' technology (Narula and Dunning 2000; Lall and Uratra 2003). The assumption behind the FDI spillover potential is that either gaining from their parent multinational companies (MNC) or their own knowledge developed internally at the host country, FDI is assumed to possess proprietary knowledge and richer experiences which can be transferred to domestic firms through various means. However, the empirical evidence is mixed and ambiguous; FDI don't necessarily bring the knowledge assets that the host needs and can assimilate, nor is it 'an unalloyed blessing' (Narula and Lall 2004; Fu et al 2011:1207; Narula 2012). The FDI spillover potential and the absorption by host countries are determined by multiple factors associated primarily with the characteristics of the foreign investor (MNC and its FDI); and the conditions at host country, its sectors and firms.

The motive and strategies of foreign firms, whether they are seeking resources, market or efficiency, determine the potential for its investments to trigger significant technological transfer to domestic firms (Gunning 1974; 2000). The assumptions are that resource seeking FDI have lower spillover potential than market and efficiency seeking foreign firms, since the latter is assumed to require more local inputs with potential to create linkage with domestic firms and as there is relatively lower barriers to entry compared to resource seeking FDI, which are often capital intensive and with higher degree of

technological sophistication. Nevertheless, the empirical evidence is not conclusive; the spillover potential of efficiency-seeking FDI also varies with the technology and skill intensity of the production process, with the production and sourcing networks, and GVC dynamics in different efficiency-seeking sectors such as manufacturing or floriculture export sectors (Farole and Winkler 2014). Moreover, ownership and management structure of MNC determines the activities of their FDI as well as the degree of knowledge transfer between the parent and the subsidiary, which in turn influence spillover potential. For instance, minority ownerships of the MNC company can demotivate knowledge transfer as it provides limited management control over the activities of FDI and in the case of a joint venture, the larger share of local ownerships can create easier access to foreign knowledge (Ramachandran 1993 cited in Crespo and Fontoura 2007).

The characteristics of host country is another critical determinant factor of FDI spillover. This refers to absorptive capacity (the ability to absorb available knowledge) of the host across various levels, such as national, industry as well as firm levels. Reaching a certain threshold in systems of innovation, for example, in terms of quality and quantity of human resource, infrastructure and R&D tends to allow for better assimilation of knowledge, increased spillover through linkages and subcontracting between local and foreign firms (Cohen and Levinthal 1990; Narula 2004; Criscuolo and Narula 2008). But this is not to imply that mere accumulation of formal education and capital goods enable efficient absorption of knowledge. For example, apart from those, firm-level absorptive capacity is about organisational skills and is a subset of technological capabilities that determine firms' ability to identify and internalise knowledge that is external to them. This indicates that FDI spillover cannot automatically occur; first of all, the knowledge gap needs to exist between foreign and domestic firms. If the gap is too low, FDI may have few technologies to pass on to domestic firms and similarly if the gap is too big (for example, in terms of scale and technological complexity), domestic firms will be unable to absorb the foreign knowledge.

Spillover is a very broad concept and difficult to measure, yet the literature identified the most common transmission channels of FDI spillover, such as demonstration/imitation, labour mobility, vertical linkages (backward and forward) (Crespo and Fontoura 2007). As Morrissey (2012) argues, a meaningful interaction among local firms and FDI need to exist in order for spillover to occur via any mechanisms. The common assumption about spillover via imitation is that the inflow of foreign firms into host countries expose domestic firms to FDI activities which is usually characterised by superior or new knowledge that might motivate them to imitate. Domestic firms usually have limited capacity to invest in 'new' technology due to the associated uncertainties and learning costs but observing the successful use of the technology by FDI (demonstration) can encourage them to adopt and imitate the technology (Wang and Blomström 1992). However, all spillover implies a certain level of interaction, willingness to share knowledge and not being overly secretive. Particularly, spillover potential through

the demonstration effect strongly depends on the foreign firm's technology intensity, FDI motive and its proximity to and interactions with local firms (Morrissey 2012; Farole and Winkler 2014).

In case of labour mobility, the assumption is that workers hired in FDI can accumulate superior skills and experience compared to workers in the local labour market, hence technologies in FDI can pass on to domestic firms when a well-trained labourer that previously worked in FDI moves into domestic firms (Glass and Saggi, 2002). However, the opposite might occur as well—FDI might attract the 'best' workers out of the domestic firms as it usually has better capacity to offer higher wages and hence eroding the capabilities of domestic firms (Sinani and Meyer 2004). In addition, FDI spillover is assumed to occur via supply chain linkages that are created because of demand for inputs from local supplier firms (backward linkages) and supply of inputs or intermediate products to domestic firms (forward linkages) (Lall 1987; Crespo and Fontoura 2007). These linkages can create exposure to higher standards which sometimes require FDI to provide training and assistance that can lead to acquisition of technical, managerial and organisational skills as well as products and process engineering know-how. This might also create competition between local firms and some may try to imitate the FDI's products and practices. In cases where countries follow inward trade regimes and if competition in domestic market is high, it forces FDI to use more advanced technologies to keep their market share which in turn might lead to technology leakage to domestic firms or pressure them to upgrade their technologies but the FDI might also make more effort to protect the leakage (Wang and Blomström 1992; Fosfuri et al. 2001). But competition is a double-edged sword, if not guided by effective policies, it can crowd out potentially competitive firms especially in an infant industry where domestic firms need some time to learn.

In general, both realisation of FDI spillover and absorptive capacities are determined by the country's broader physical, knowledge, and legal infrastructures as well as services. More importantly, by trade and industrial policies that attract appropriate types of foreign firms, incentivise investing in local R&D investment, on-the-job training as well as actively promote interactions between foreign and domestic firms (Lall 1993; Akyuz 2015). As highlighted by some authors such as Staritz and Frederick (2012), Morris and Staritz (2014), Farole and Winkler (2014) nowadays, multinational corporations and their FDI operate in the form of GVCs and thus in addition to business strategies of MNCs and absorptive capacity of host country, the potential spillover is determined and mediated by the specific GVC dynamics such as governance structure, to which the next part turns to.

2.3.3. Global value chain governance

National innovation systems have been increasingly exposed to global forces that shape economic activities taking place within national boundaries (Pietrobelli and Rabellotti 2011). Thanks to the expansion of GVCs, which created a new source of international knowledge alongside existing

mechanisms of FDI spillover and technology licensing. GVC/GPN refers to globalisation of production in which economic activities takes place in a fragmented and dispersed manner across various geographic boundaries, in organisations that usually have no equity relations. Those spatially and organisationally fragmented functions get reintegrated and brought to consumption by means of control and coordination mechanisms (GVC governance) exercised by specific actors in a chain (Gereffi et al 2005). Governance structure vary across and within GVCs, having different implication on upgrading and TC building opportunities for supplier firms in developing countries (Schmitz 2006; Humphrey and Schmitz 2002a; 2002b). However, the latter authors also highlighted that apart from GVC governance structure, strategic intent of the supplier firms, such as making the necessary investments for upgrading, is important as well. The concept of upgrading will be discussed in section 2.4.2. and this section focuses on the concept of GVC governance in relation to learning.

In the vast literature of GVC, governance is studied extensively and conceptualised in several ways: governance as 'driving', 'coordination' or 'linking' and 'normalization', which despite their differences can be complementary to each other (Gibbon et al 2008; Ponte and Sturgeon 2014). However, based on the relevance for this thesis, the subsequent discussion will focus on GVC governance as 'coordination' or 'linking'. The GVC governance theory originates from the seminal work of Gereffi (1994) in which he identified that powerful MNC or 'lead firms' drive the whole chain by dictating terms of participation in such a way that configure the division of labour. Governance entails authority and power relationships between firms that determine how the resources (material, financial and human) are allocated and flow within a chain. These lead firms in buyer-driven and producer driven-chains, set the rules under which the others in the chain operate using their power, which is derived from barriers of entry to certain functions in a specific chain, for instance, controlling access to major resources and capabilities such as product design, new technologies, brand names, marketing or consumer demand. However, taking dynamic views towards technology and barriers to entry, empirical works revealed more types of chains, which led to reconceptualising governance as inter-firm linkage or coordination (Gereffi, Humphrey and Sturgeon 2005).

In the global markets where non-price competition is key, powerful buyers seek to engage in coordinating and governing the chains in order to avoid the risk of supply failure to meet their requirements (for instance, product definition or process standards). This results in buyer-supplier relations and coordination that is characterised by various levels of intensity, depending on three variables that are related to the nature of technology involved and level of supplier's capabilities. More specifically: i) the *complexity* of information and knowledge transfer required to sustain a transaction especially in relation to product and process specifications, ii) the extent to which the information and the knowledge can be *codified* and transmitted efficiently between parties and without transaction-specific investment, and iii) the *capabilities* of supplier firms in relation to the requirements of the transaction (Gereffi et al 2005:85; Sturgeon 2007). The score matrix using the three variables offer eight

possible combinations but the three of which are dropped as they are highly unlikely to occur (inherently impossible). As shown in Table 2.1. below, the remaining five modes of chain governance proposed by Gereffi et al (2005) puts market and hierarchy relations as two opposite poles in the continuum of governance structures and in between there are three network relationships (modular, relational and captive). Each of the five types of chain governance offer various opportunities for knowledge flow from lead firm to supplier firms in developing countries.

Table 2.1. Learning mechanisms within global value chains

Governance types	*Complexity of transactions*	*Ability to codify transactions*	*Capabilities of suppliers*	*Learning mechanisms within GVC*
Market	Low	High	High	Knowledge spillover; Imitation
Modular	High	High	High	Learning through pressure to accomplish international standard; transfer of knowledge embodied in standards, codes, manuals
Relational	High	Low	High	Mutual learning via face-to-face interactions
Captive	High	High	Low	Learning via deliberate knowledge transfer from lead firms confined in a narrow range of tasks such as simple assembly
Hierarchy	High	Low	Low	Imitation; turnover of skilled managers and workers; training by foreign leaders and owner; knowledge spillovers

Source: Pietrobelli and Rabellotti 2011 adopted from Gereffi et al 2005

In market-based governance which assumed to occur when product specification is relatively simple, transactions are easily codified and supplier firms have the capability to make the product without assistance from buyers. The complexity of information is relatively low and little coordination is needed in such chains but market relations may not necessarily be transitory as commonly perceived in spot markets. It can involve repeated transactions that remain for longer periods, yet the cost of switching to new partners is low for both transacting parties. In such chains, buyers neither actively support to nor block their suppliers' from upgrading their capabilities but sometimes competent suppliers use such exposure and insights to develop their capabilities to enter new chains as shown in the case study of Brazilian shoe producers (Bazan and Navas-Aleman 2004).

A modular type of governance has some similarity with market-based ones in terms of codifiability of the knowledge and low cost of switching partners but products are complex and require supplier firms to have higher capabilities to make full packages as well as components by internalising not only codified but also tacit knowledge that can reduce buyers' need to directly monitor and control. In case of relational governance, despite higher capabilities of supplier, product specifications cannot be codified and transactions are complex, requiring intense interaction in order to exchange tacit

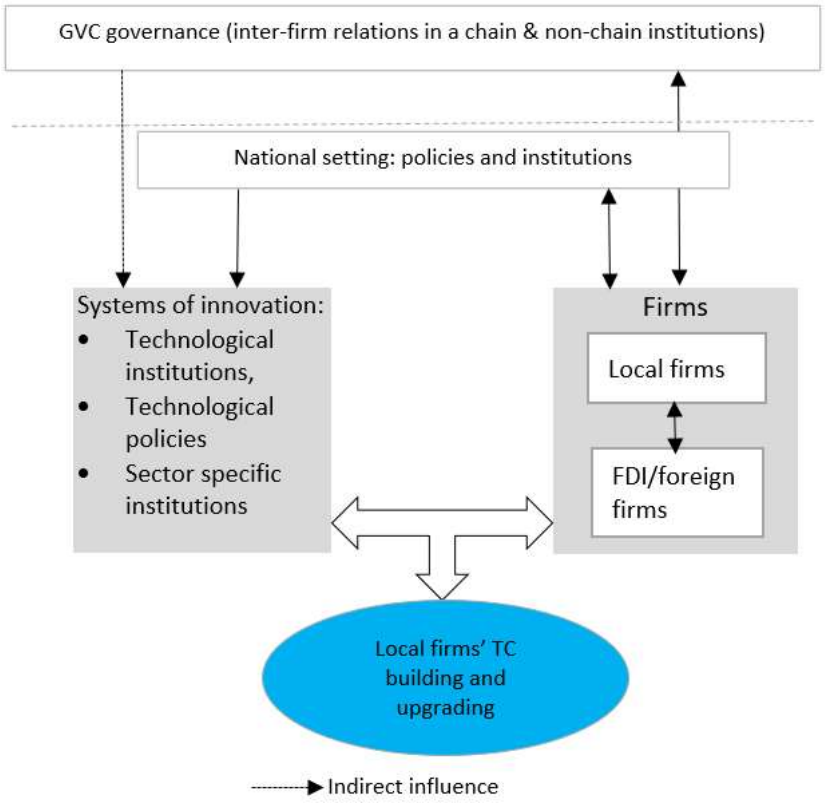
knowledge. This situation often leads to mutual dependence that might be regulated through reputation, social, family, friendship ties, etc. Relational chains are characterised by explicit coordination and frequent interactions including face-to-face meetings, which make the cost of switching to new partners high but offering better opportunities for knowledge transmission and suppliers' upgrading. This is more so in captive network governance, which arises where the codifiability and the complexity of product specifications are high, but capabilities of supplier firms is low. When buyers are forced to engage in such situations, it involves close relationships and knowledge flow creating conducive conditions for suppliers to improve their capabilities. Nevertheless, the greater interventions and control of buyers might lead to 'lock in' of supplier firms in order to prevent them from sharing with competitors. Due to that, suppliers tend to focus on limited ranges of activities and become dependent on complementary activities of lead firms. In the latter type of chains, switching to new partner is unattractive especially for supplier firms, since not only do they face significant switching costs but also because of lead firms' resources and market access provisions that can make switching less attractive. The last type of value chain governance identified by Gereffi et al (2005) is hierarchy or vertical integration (or FDI), which usually occurs when products are complex with a low codifiability of product specifications. Lead firm might internalise production and govern it through management hierarchy as there are no highly competent suppliers to fulfil the requirements.

As shown in Table 2.1., Pietrobelli and Rabellotti (2011) build on the work of Gereffi et al (2005) and draw explicit links between each governance structure and learning mechanisms within such GVCs and argued that as GVC and effective national innovation systems provide the necessary knowledge inputs and support services that enable supplier firms to meet the requirements in GVC and switch from captive GVC into GVC with more relational or modular governance. Here the latter are assumed to offer higher potential for suppliers' upgrading but this assumption cannot be generalised, for instance, the empirical study of Fransen and Helmsing (2017) reveals that supplier firms operating in both captive and relational governances can be as innovative. Similarly, Coe and Yeung (2015) argued that through optimisation process of cost-capability ratio, lead firms and suppliers attain greater firm-specific capabilities and value capture in global production networks. Optimal cost-capability ratio can be achieved by reducing cost or developing new capabilities or improving both, but the optimisation process varies across firms and is dependent on firms' initial capabilities. Coe and Yeung present a matrix of cost-capability ratios in GPNs, where supplier firms that enter in the low cost-low capability quadrant, such as in manufacturing export sector, they tend to be a price-taker with a weak bargaining position in the GPN as they can be easily substituted by other supplier in the same or other low-cost locations. So, their survivals might depend on cost structure characterised by low wages, sub-standard quality or poor working and safety conditions. In order to avoid such a 'race to the bottom' condition and to become internationally competitive, the supplier firms need to move towards a lower cost–capability ratio, which requires improving their TC in areas such as quality, yield, design, speed, inventory management,

logistics, and after sales support, etc. This can be achieved with firm specific learning as well as with extra-firm institutional supports, such as industrial policy and national innovation systems.

The GVC governance approach of Gereffi et al (2005) is criticised for its inter-firm centred approach, despite its useful potential for general applicability or the 'placeless' feature of it (Bair 2008:357). Proponent of global production network (GPN) framework criticises the approach of GVC and researchers such as Gereffi et al (2005) for limiting their conceptualisation to inter-firm relations; ignoring the role of extra-chain actors in shaping the governance (Coe et al 2008). They highlight the role of embeddedness (social, territorial and network) in shaping GPN/GVC configuration and the actions of players in the chains. For instance, nationality and cultural proximity influence spatially selective internationalisation; institutional and regulatory contexts interact with the rules within GPN/GVC and shape the governance therein (Hess and Coe 2006; Helmsing and Wellema 2011). Similar critiques were raised by several GVC scholars, underlining that inter-firm focus does not explain chain governance in its entirety as factors external to the chain, such as international and national institutions and public and private non-firm actors such as NGOs, can influence governance (Gibbon 2003, Riisgaard and Hammer 2008).

Figure 2.1. Factors and interactions that shape TC building of local firms



Source: author's construction

Figure 2.1 shows a simplified depiction of the three external factors that are discussed above and their interactions with local firms, and how they shape TC building and upgrading trajectories of local firms. The GVC governance entails interaction between global buyers or lead firms/agents and supplier firms (both local and foreign firms) to source a product but the intensity of interactions varies depending on types of governance in the chain. As the GVCs lands in the national boundaries, it interacts (at least, indirectly) with the national systems of innovation as it influences what types of knowledge is to be created (e.g. sector specific standards) through its relations with local supplier firms, which are assumed to be part of the system. Similarly, the macroeconomic management, trade and industrial policies interact with firms as well as with innovation systems, since they determine the accessibility and availability of inputs such as finance, skills, knowledge infrastructure and foreign technology available in the country. Government policies also influence interactions between firms (both local and foreign firms) and their investment in-house training and development of skills. Likewise, firms might engage in strategic collaboration with and lobbying government for conductive policies and for improving factor markets. These complex interactions shape local firms' TC building and upgrading processes, but it is important to concretely identify exactly what TC are and their relations with the concept of upgrading, which will be the focus of the next section.

2.4. Categories of technological capabilities and upgrading in global value chains

2.4.1. Categories of technological capabilities:

Any firm needs to have certain core functions in order to run and sustain its operation, but these core functions may not be necessarily performed in-house. Based on empirical research in developing countries, scholars identified functions generally concerned with process technologies and product technologies with various design and engineering tasks. They also underlined the management of those functions and linkages with other firms, organisations and institutions (Dahlman, et al 1987; Lall 1987; Lall 1992; Bell and Pavitt 1995; Amdsen 2001). The literature usually grouped functions by project life cycle ((pre)investment, production and innovation) and to various degrees, differentiated levels of capabilities (depth or complexities) between and within each function (capabilities) and sometimes sequenced their development. Despite some minor differences, the scholars proposed similar functional dimensions and underlined level of complexities within each function. Building on that, Lall's (1992) explained the two TC dimensions (functions and complexities) more clearly using a matrix. As shown in Table 2.2. below, he identified functions: investment, production and linkage capabilities that constituted the horizontal axis of his matrix while vertical axis displayed the complexities of each functions/capabilities: 'basic'—referring simple routines (experience based), 'intermediate'—adaptive and duplicative (search based) and 'advanced'—innovative and risky (research based).

Table 2.2. Matrix describing functional categories and complexities of TC

Degree of Complexity		*Categories of technological capabilities*		
		Investment	Production	Linkages
	Basic			
	intermediate			
	Advanced			

Source: adapted from Lall (1992).

Investment capabilities: includes skills that are needed to "identify, prepare, obtain technology for design, construct, equip, staff and commission a new facility (or expansion). They determine the capital costs of the project, the appropriateness of the scale, product mix, technology and equipment selected, and the understanding gained by the operating firm of the basic technologies involved" (Lall 1992: 168). This means that apart from construction of plans, it includes start-up of operation and troubleshooting before launching a full operation. However, as pointed out by Bell (2007) these functions are not necessarily limited to investment phase of project life cycle; rather they are required at post-investment phases such as to upgrading equipment and workers' skills, to solve product or process related problems. *Production capabilities*: refer to broad ranges of skills related to both product and process technological capabilities as well as monitoring and control functions associated with industrial engineering. These functions are required to improve productivity, production planning, distribution systems and reliability of delivery (Biggs et al 1995). Although they have different levels of complexity (from basic to advanced levels), acquiring those TC is difficult and costly (time and money) even at their basic capabilities levels, such as running operation, quality control and maintenance.

Linkage capabilities: are skills that are needed to transmit information, skills and technology to, and receive from various actors in external environment (Lall 1992:168). Linkage is an important concept found across all the major theories that informed the analytical framework of this thesis, as it signifies interaction which is central in learning. Firms generally operate in formal and informal network relationships with suppliers, customers, competitors, consultants, and technology, research and educational institutions. And these networks might take the form of contractual and non-contractual linkages (Lall 1985; Lall et al 1994). Before the advent of GVCs approach, Lall and colleagues conceptualised 'market barriers' from the perspective of exporters in developing countries Lall (1991) and Keesing and Lall (1992) emphasised the importance of forward linkages with buyers, agents and importers located at export destination. They explained how such linkages create knowledge flow that can transform a competitive producer into a successful exporter since the latter usually requires higher and/or different capabilities than producing for local markets, regardless of level of competitiveness.

The knowledge flow in those inter-firm relationships helps producers to overcome pre-shipment and post-shipment marketing barriers, which includes an array of functions (some are related to the rise of

non-price competition and distance from market) beyond the conventional notion of marketing barriers that arise from brand name and advertising. For instance, pre-shipment barriers include product design, product quality, packaging, presentation, shipment and delivery, while post-shipment includes distribution and sales centre, after-sale services, brand promotion and so on. Although the advancement of technology minimised some of these barriers, the constraints still remain relevant in the contemporary export market. This is also evident by the fact that most of these issues are re-conceptualised in GVC literature (albeit with a more focus on power relations) as functions with higher barriers to entry from which some big buyers (lead firms) derived power that enable them influence allocations of activities, resources and rents within chains (Gereffi 1994).

As Lall (1992) acknowledged, TC categories (investment, production and linkage capabilities) can vary in application and relevance across industries and they may not even be exhaustive enough to include every core functions of various industries and by doing so, he provides room for flexibility to account for sector specificity. Accordingly, several studies that applied a version of Lall's matrix in their empirical research (Biggs et al 1995; Pieterobelli 1998; edited volume of Kawakami and Sturgeon 2011) made their own adjustment to fit their specific cases. However, as Bell and Pavitt's (1995) commented the complexities of each functions (capabilities), which constituted the vertical axis of Lall's matrix, failed to fully capture 'non-creative' operations observed in many developing countries (Bell 2007). Thus, the authors argued for adding a row called 'basic production capabilities' to capture TC to use existing production techniques, while the three levels (basic, intermediate and advanced) are capable of capturing or indicating TC to *generate and manage* technological change. However, in practice, it is very difficult to strictly distinguish between TC to use and TC to generate and manage technological change. In fact, as Lall et al (1994) argued, it is rarely possible to use existing technologies without making some search and modification (however small that might be) to make it fit a specific context or achieve 'static efficiency' or get into production.

Therefore, this thesis acknowledges that there might be elements of 'non-creative' or 'basic production capabilities' operation and considerations of firms' effort beyond getting into production. However, this can be achieved within Lall's framework and making a finer distinction using an additional row is not found relevant for this thesis. Thus, Lall's matrix is applied after adjustments made to capture sector specificities as well as the contemporary global trend in relation to what is demanded from exporters of developing countries in securing competitive edge. In this regard, the thesis draws on the GVC literature that examines the effects of GVC governance on upgrading potential of supplier firms that are located in developing countries. As it is discussed in the following section, the concept of upgrading largely overlaps with TC functions and can be usefully combined with Lall's TC framework to advance understanding of firms' upgrading trajectories and TC building processes; as well as to define and measure TC of supplier firms participating in a specific GVC. Although the GVC literature gives less emphasis on decisions and efforts at the level of supplier firm, it examines the characteristics and the

effects of market related linkages in the global economy, to a greater degree than the TC approach whose relative focus is on internal dynamics and efforts of supplier firms. Therefore, as pointed out by Morrison et al (2008), combining the two approaches strengthen each other's weaknesses.

2.4.2. Upgrading in global value chains approach

Alongside the spatial dispersion and reintegration of functions, GVC literature explores cross border transmission of technology and knowledge that takes place primarily as a consequence of buyer-supplier linkages. Upgrading is the concept commonly used in the literature to analyse this process of learning by supplier firms. Organisational learning is one of the critical mechanisms by which firms try to improve or consolidate their positions within the chain, which requires them first to be inserted in GVC and link up with lead firms in such ways that make the firms increase value creation and learning (Gereffi 1999; Gereffi et al 2001). Once they joined GVC, firms need to upgrade continuously in order to maintain or improve their income in the face of increasing global competition. This mainly involves developing their TC or skill content in their activities and/or ability to move into markets where entry barriers are higher (Humphrey and Schmitz 2002).

Drawing on cluster and value chain literature, Humphery and Schmitz (2002) conceptualised upgrading in more concrete terms and proposed fourfold typologies of upgrading that was broadly applied in GVC approach: *Process upgrading* denotes improving the process of transforming inputs into outputs in a more efficient way, *product upgrading* is defined as a move to more sophisticated products, *functional upgrading* is acquiring or switching to new functions in the value chain that require new skills, and *inter-sectoral upgrading* is defined as moving into more sophisticated but related chains by utilising skills accumulated in the previous chain (1020-1021). Nonetheless, those upgrading opportunities do not occur in all GVCs, but vary depending on the governance structure (Schmitz 2006). Using the conceptualisation of governance by Gereffi et al (2005) - the vertical inter-firm linkages and the uneven nature of power relationships between lead-firms (big buyers, retailers, marketers, etc.) and supplier firms, different upgrading potentials are explained.

For instance, despite the risk of 'lock-in' in narrow ranges of activities, captive chains often lead to process and product upgrading such as improving quality, productivity and fixability (Schmitz and Knorringa, 2000; Giuliani et al 2005). But those chains offer limited opportunities for functional upgrading, which are often perceived to have a higher potential to allow capturing higher value. In contrast to the case of product/process upgrading, where lead firms encourage suppliers' upgrading, they tend to hinder functional upgrading as it oversteps into their core competencies such as design, branding and marketing functions. However, as illustrated in some sectors such as apparel, the discouraging actions of lead firms does not always stop supplier firms from functional upgrading (Tokatli 2007).

The conventional upgrading framework (the above fourfold typologies of upgrading) has been a useful analytical tool for empirical study but its increasing application also exposed its weakness in capturing the practical dynamics on the ground (Pickles et al 2006; Ponte and Ewert 2009; Tokatli 2013). For instance, drawing on the experience of South African wine sector, Ponte and Ewert (2009) reveal the difficulties in distinguishing between process and product upgrading since the introduction of new processes can generate new categories of products (e.g. 'organics' or 'Fairtrade'). The authors also underscore that confining process upgrading at the production level ignores the fact that such capabilities are required beyond production, for example to improving logistics, shipment planning and cool-chain management, especially in perishable product sectors. In addition, defining process upgrading in terms of improving efficiency fails to capture efforts to matching standards (technical, environmental, social/labour standards) that are required by private and public governance. Although such exercises might lead to better production procedure and product quality, they do not necessarily improve efficiency nor lead to higher price. Nonetheless, product/process upgrading efforts might entail another pattern of upgrading (supply chain upgrading) or backward linkage through local coordination (*contractualisation)* or vertical integration (Riisgaard et al 2010) in order to source the right quality and quantity of inputs at the right time, since the local supply chain might fall short in meeting the global standard.

This already shows the real-world patterns of upgrading is complicated but it gets more so with the emergence of new demands; for example in global South, which is often characterised by less stringent requirements and product sophistications compared to the traditional markets in global North. The new end markets opened additional opportunities for supplier firms in developing countries and they tend to exploit it by using various strategies at a time without necessarily moving to new functions. This might include upgrading, downgrading and/or deepening functions. For example, taking advantage of high volume instead of high quality while at the same time matching certain standards (Ponte and Gibbon 2005) or adding 'low value' products in portfolio (downgrading) to diversify (end-market upgrading) to less demanding regional markets without necessarily abandoning 'high value' products and markets (Sartitz 2012; Barrentos et al 2015). This is consistent with the critics of Morrison et al (2008) about the concept of upgrading. Despite acknowledging the superiority of certain capabilities to move into value-added activities, it emphasised 'functional upgrading' or switching to other functions while ignoring the importance of 'deepening' at the same node of the GVC, which usually requires developing new capabilities or deepening existing functions. The recent empirical study of Fransen and Knorringa (2018) supports this claim as it highlights the prevalence of deepening among exporting firms in developing countries rather than functional upgrading.

Those drawbacks of the conventional upgrading concept in explaining the real empirical dynamics is largely connected to the very conceptualisation of upgrading (capturing higher value) as a linear and an upward move (Morrison et al 2008). On top of that, such moves are implied to be the result of firms'

'pro-active' strategies (Plank and Staritz 2015). However, none of these alone explain the realities on the ground, rather firms move in various directions (upgrading, downgrading and deepening) and take up/drop off different functions to increase their profitmaking capacity (Tokatli 2013). Similarly, not all actions of firms are necessarily pro-active nor do they lead to capturing higher gains. Some moves might be part of firms' 'defensive' strategy in response to external events or shocks that push them to upgrade or a 'survival strategy' in the context of competitive pressure which may not result in higher gain but help to stabilise their income or minimise risks (Plank and Staritz 2015). In order to avoid misunderstanding and confusion, some scholars proposed focusing on understanding the capacities of firms in making profits and capital accumulation, rather than using the term upgrading (Tokatli 2013), while Ponte and Ewert (2009) proposed approaching upgrading broadly as 'reaching better deal' which denotes a balance between rewards and risk. Similarly, Coe and Yeung (2015) called this dynamic and multi directional moves and strategies of firms 'value capture trajectories'. The authors explained how firms' value capture varies over time involving various degrees of growth, decline and stagnant periods with implications on rate of value capture. As a result, in order to improve their value capture supplier firms might follow various strategies including dropping a certain end markets or inter-firm relationships; they might enter new markets and form new relations.

More recently upgrading literature moved beyond economic upgrading, which referred to what is discussed to this point, to examine its relations with social upgrading. The latter is concerned with workers that are integrated to a GVC through those supplier firms. It examines whether firms' economic upgrading (e.g. process or functional) lead to social upgrading which means improvement in working conditions in terms of measurable standards and enabling rights (Knorringa & Pegler 2006; Barrientos et al 2011; Evers et al 2014). Measurable standards include observable and easily quantifiable factors such as wage, types of contract (regular, irregular workers), social protection, etc; whereas enabling rights are less quantifiable factors such as freedom of association and the right to collective bargaining, which are important by themselves as well as influence the measurable standards. The empirical studies show that economic upgrading does not necessarily lead to social upgrading and mixed results were revealed across sectors as well as within a firm across groups of workers.

As explained in the following section, this thesis draws on those lessons in the literature and combine the concept of upgrading with Lall's TC matrix to develop the analytical framework of the study that helps measure and better explain the process of building technological capabilities and upgrading trajectories of local firms in Ethiopian floriculture export sector in the context of global value chains.

2.4.3. Technological capabilities and upgrading: Combined conceptualisation

A single GVC is made up of several strands (Ponte et al 2008). For example, the GVC for floriculture have various strands based on product types such as summer flowers, rose, cuttings and functional

upgrading can take place not only by switching to new strands (for example, from rose to cuttings) but also by deepening at the same strands of GVC. Firms can add/drop activities (upgrade, downgrade, deepen) simultaneously in order to participate in various GVCs. Therefore, the TC required to enter, remain competitive and capture greater value or reaching better deal in specific GVC can be described in a matrix that combines the two dimensions of TC (functions and their level of complexities) and the upgrading typologies of the GVC approach as illustrated by Table 2.3.

Table 2.3. Matrix for describing GVC-Specific Technological Capabilities

Complexities of TC/ functional upgrading		*Categories of technological capabilities*					
		Investment	Product	Process	Linkages/supply chain	Logistics, finance & support	End market
	basic						
	intermediate						
	advanced						

The vertical axis of the table corresponds with functional upgrading, since moving to different strands of GVCs requires adding new functions usually involving more complex capabilities. Thus, each row indicates that firms are operating at particular strand of GVCs. In this context, the elaboration of basic, intermediate, and advanced has to be done at sector specific, GVCs level and can include more rows, as necessary to capture real world patterns of upgrading within a certain GVCs. In this conceptualisation, it is possible that one firm can operate at multiple strands (rows).

The types of activities, or Lall's categories of technological capabilities, in each column needs to be modified to reflect what is important to entering and remaining competitive in specific GVCs, but also to reflect that firms can deepen and strengthen their capabilities within a specific strand in a single GVCs. Therefore, the descriptions of the capabilities required at each strand in the GVCs (row in the matrix) will recognise that firms can put in increasing technological effort to search, learn and improve their capabilities, and thus there is an element within each row where firms move from the basic capabilities required to operate at that strand, to capabilities that generate and manage technical change. In general, the matrix takes into account the movement to new, upward strands in GVCs, which is represented through the rows. Technological deepening in the same strand of GVCs, which is represented through the columns and includes process upgrading (deepening), but also product, supply chain and end market upgrading and the latter three, which may correspond to movements along rows, or they may not. This is illustrated by Table 2.4. below, which presents the floriculture GVCs Technological Capabilities Matrix and the details of each row is presented in Chapter 3.

Table 2.4. Floriculture GVC Technological Capabilities Matrix

Functions	*Investment*	*Production*		*Linkages*		
		Product	Process	Supply chain; horizontal relations	Logistics, finance & support	End market
Grow and Cut-subcontracting (GC-subcontracting)						
Grow, Cut, Package (GCP)						
Flower Design & Bouquet (FDB)						
Commercial propagations & cuttings (CPC)						
Breeding new flower varieties (BNV)						

Source: author's construction[7]

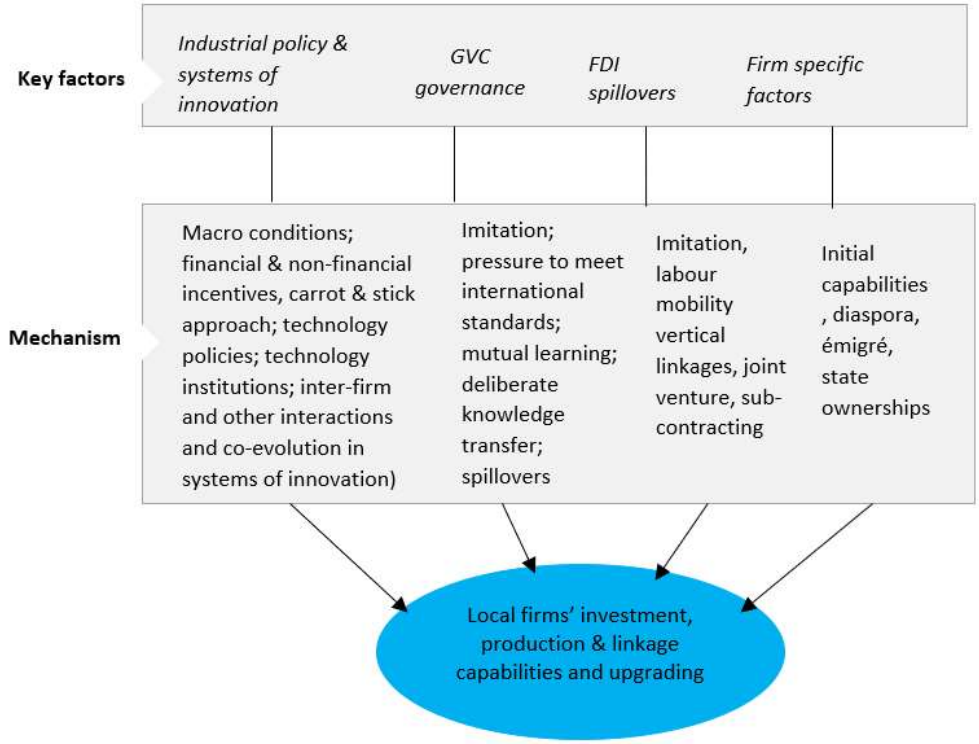
2.5. Key drivers and mechanisms of firms' capability building and upgrading

As the above discussion shows, firm's TC building and upgrading is influenced by firm specific internal characteristics as well as external key factors that play at global and national levels such as national settings (policies and institutions), FDI spillovers and GVC governance. The thesis assumes that these factors interact with each other (as shown on Figure 2.1. above) and influences firm-level process of upgrading and building capabilities. The latter happens through various mechanisms. As the Figure 2.2. below shows, the presence or absence (strength or the weakness) of certain mechanisms associated with each key factor, impacts firms' learning and their TC building process. National settings create an incentive environment for firms' capability building process through policy and institutional mechanisms. For instance, trade policies (import and/or export orientation) influence level of competition hence create pressure on firms to build TC; less restriction to import technology, easy access to finance and availability of easily trainable labour, lower firms' investment barriers, all reduce learning cost and hence encourage TC building. Furthermore, attaching measurable performance standards with financial and non-financial incentives and monitoring the performance (or 'carrot and stick' approach) compels firms to invest in learning and build their TC. Intending to enjoy the 'carrot' or rent created by

[7] I would like to acknowledge the collaborative effort of AFRICAP team in developing GVC-specific Technological Capabilities matrix (Table 2.3**)** and our brainstorming sessions that helped to define each function in floriculture GVCs and to develop the associated acronyms.

the policies, firms are assumed to invest in sectors where incentives are provided and put in place learning efforts in order to avoid the consequence of failure such as losing access to the rent ('stick'). Furthermore, national and sector specific policies and institutions influence encourage firm-level learning and TC building through developing effective systems of innovation, which includes: encouraging collective actions of firms, selectively importing technology, attracting FDI, inducing interaction and co-evolution between firms and knowledge institutions as well as linkage and interaction between local and foreign firms.

Figure 2.2. Key factors and mechanism driving firms' capability building and upgrading



Source: author's construction

FDI is the other key factor that shapes firms' TC building. The presence of FDI/foreign firms operating in the economy is assumed to create better conditions for local firms to access a superior bundle of knowledge (technical, managerial and organisational) through various mechanisms such as imitation (the exposure to new knowledge effect in which local firms get triggered to invest in similar technology in order to improve their competitiveness), labour mobility (skilled labour trained by foreign firms can move to local firms as a result, local firms use the knowledge brought by the labour to improve their TC) and vertical linkages, for instance, backward linkage as input provider and forward linkage (local firms using sales, distribution or marketing service of FDI) create exposure to higher standards which

sometimes require FDI to provide training and assistance that can lead to acquisition of TC by local firms.

Regarding GVC governance, the five types of governance (market, modular, relational, captive and hierarchy) are assumed to create various learning mechanisms, as listed in Table 2.1. above. For instance, in market-based governance, imitation is the major learning mechanism; while in modular chains learning mainly takes place through lead firms' pressure on local firms to accomplish international standards and here knowledge gets transferred through standards, codes, manuals and so on. In relational governance, mutual learning via face-to-face interactions are the main mechanism of learning while in captive chains, learning takes place via deliberate knowledge transfer from lead firms; and lastly, in hierarchy governance the learning mechanisms are similar with FDI spillover mechanisms such as imitation and labour turnover.

Apart from the external factors, firm specific characteristics also influence their TC accumulation process. Firms' prior experience and initial capabilities shape their ability of learning such as how to assess risks associated with various businesses, choosing the 'right' strategies, building the 'right' network and overall capabilities to improve international competitiveness and capture higher value. Moreover, firms that are owned by diaspora are assumed to have unique advantages arising from their owners' exposure to higher standard of doing business in their country of residence and/or they might have built network relations that helps them in their home country's investment. Similarly, firms with state ownership might have greater access to resources (financial as well as knowledge) needed for learning, while at the same time facing higher compulsion by government to make technological effort and hence build their TC upgrade in global value chains.

2.6. Conclusion

This chapter presented the theoretical framework of the thesis, which is developed drawing on various strands of literature that are related yet not adequately interconnected. The technological capabilities approach, which is at the centre of the theoretical framework, provided the theoretical lenses to understand the meaning of TC and their acquisition process as well as a mechanism to operationalise the abstract concept of TC for empirical studies. Although the approach clearly specifies that firm-level TC building process takes place in interactive manner of internal and external factors, it is not systematic enough in terms of clearly distinguishing the external factors to simplify and to make it analytically more useful in the context of contemporary global economy where activities are usually organised in global value chains. Other literature, such as GVC approach, national innovation systems, FDI as well as industrial policy, does show how external factors such as national policies and institutions, GVC governance, FDI spillovers, influence firms' investment in learning. However, they do not pay enough attention to the internal dynamics of local firms in low income countries. By bringing together those

complementary but hitherto largely separate field of studies, the chapter developed the theoretical framework that enables us to address the research questions in a much fuller sense. In so doing, the chapter showed the advantage of integrating ranges of concepts, particularly drawn from the related body of literature in order to undertake comprehensive as well as deeper empirical investigations.

Furthermore, the chapter presented a generic matrix, which is developed by combining Lall's TC framework and upgrading as conceptualised in GVC approach to make it more fitting to the contemporary organisation of global production, while remaining flexible enough to consider sector specificities. The next chapter further elaborates on the sector-specific matrix–floriculture GVC technological capabilities matrix, introduced in this chapter, drawing on the floriculture GVC literature where the specific role of the GVC governance in determining supplier firms' upgrading will be explored, focusing on its impact in relation to Ethiopian-owned flower firms.

3. Floriculture Global Value Chains: Sales Channels, Governance, and Upgrading

3.1. Introduction

This chapter aims to understand how governance structures in floriculture GVCs shape the learning and upgrading process of supplier firms in developing countries. It also extends the discussion of the previous chapter (Chapter 2) and develops the sector specific floriculture GVC matrix. In doing so, the chapter moves a step further to address one of the specific questions of the thesis and will provide a building block for the subsequent empirical chapters. This task requires knowledge of the key features of the floriculture GVCs, their governance structures, and how it influences firms' strategy in building capabilities and upgrading. There is a small body of literature on the floriculture GVCs, and even less that focuses on upgrading and learning among locally owned supplier firms in developing countries. Therefore, this chapter also contributes to filling these gaps in the literature, using new empirical material produced through the firm survey interviews with market actors at the Dutch auction.

The second section of the chapter presents the development of the floriculture GVCs, focusing on the major exporting countries. It also explains core market features such as specialised market segments (florists, web-shops) and unspecialised market segments (supermarkets, gas stations) in relation to the two main sales channels: auction and direct sales. The section also explores an emerging trading system (online trading) as well as an emerging demand in global South, such as in the Middle East. While the Dutch auction, preferred by the specialised segment, continues to play a dominant role in the floriculture GVCs, the market share of the direct sales channel, which is largely used by the unspecialised segment, is growing. Even specialised wholesalers seem to engage increasingly in the direct sales channel. Additionally, a growing demand in the global South is opening up additional opportunities for supplier firms in developing countries to engage in the direct sales channel.

The third section of the chapter discusses governance structure and the issue of upgrading in the floriculture GVC. Focusing on the traditional markets as well as tracking the new destinations (largely the Middle East) of flowers exported by Ethiopian-owned firms, the section describes the role of the Dutch auction, buyers, and non-chain actors and institutions that influence governance in the floriculture GVC. The auction channel is the most important channel for Ethiopian-owned firms, but their participation in the direct sales channel is increasing. Governance in floriculture GVC is influenced not only by chain actors, most importantly lead firms, but also by non-firm institutions such as national legal requirements, international regulations, and sustainability initiatives. Furthermore, buyers across channels and end markets have their own requirements, which mostly include product specifications (quality, variety, volume) and time of delivery (presence at the auction) while emphasising reliability and consistency related to those aspects. Usually direct sales to Western supermarkets require meeting

the most stringent specifications, by contrast, the requirements are lower in direct sales to the Middle East markets and in the auction at the minimum requirement level (institutional rules). Although, specialised wholesalers and 'auction-direct'[8] buyers set rather stringent requirements that roughly fall between the two extremes.

The empirical evidence of this thesis uncovers layers of governance at various nodes of the Dutch auction channel such as relations between the auction's importing department (the minimum institutional rules) and suppliers and relations between unpacker firms at the auction and suppliers. Although no single governance type captures the feature of each node, the supplier-unpacker relation is more like relational involving close interactions in order to improve their mutual gain through supporting suppliers to consistently meet buyers' requirements and capture higher price. The intensity of their interaction and coordination might decline as supplier firms build higher capabilities, but the relationship remains crucial. Furthermore, concerning the Middle East end market, the evidence shows that it is largely characterised by market-based governance, but it involves significant personal relationships geared towards building trust and networks that are needed to secure sales and market positions.

The diverse governance structures in the floriculture GVC have implications for suppliers' strategy for learning and upgrading, which is also discussed in the third part of this chapter. Upgrading in the floriculture generally confirms the complexity discussed in the literature (see Chapter 2) - unlike what is perceived in the fourfold upgrading typologies of upgrading (product, process, functional, and inter-sectoral or chain), 'upward move' in the value chains does not necessarily lead to capturing higher value, and accordingly, supplier firms in floriculture GVC follows various strategies in order to capture higher rewards, stabilise their income and minimise risk, which might entail upgrading, downgrading as well as strategic diversification. These complexities can be captured in the floriculture GVC technological capabilities matrix presented in the last part of the third section. Based on the discussion in the chapter, the sector specific technological capabilities matrix, which was introduced in Chapter 2 is further developed by filling in the activities/functions required in order to participate in specific strand of floriculture GVCs and that gives a basis to measure the TC of the firms therein. The last section concludes summarising the key points of the chapter.

[8] In this thesis I use 'auction-direct' for direct trade that takes place under the auction system so that it will not be confused with the term 'direct sales' which refers to channels other than auction system.

3.2. Floriculture Global Value Chains

This part of the chapter discusses the development of the floriculture GVC. It briefly traces the evolution from regional flower market to the global value chain, explaining the main features, major players, and dynamics in market channels. Flowers are traded in two market channels: auction and direct sales. The Dutch auction is the most dominant one worldwide, and the Netherlands remain a global hub of floriculture trade. However, since 1990s the direct sales channel has grown rapidly in traditional markets (European, North American and Japanese) as well as elsewhere. Although direct sales are often associated with Western supermarkets, other retailers and wholesalers are increasingly engaging in direct sales channels in various end markets including European and Middle Eastern markets. Furthermore, the Dutch auction is hosting a new trading system that is seemingly in direct competition with the tradition auction (Clock system). The new trading system (online-trading) is used by most of the Ethiopian-owned flower firms, alongside the auction. These various market channels and end markets have distinct and overlapping characteristics that offer opportunities as well as challenges to suppliers. The Ethiopian suppliers engage in a number of these channels and end markets by continuously trying to weigh risks and gains of each channel and market.

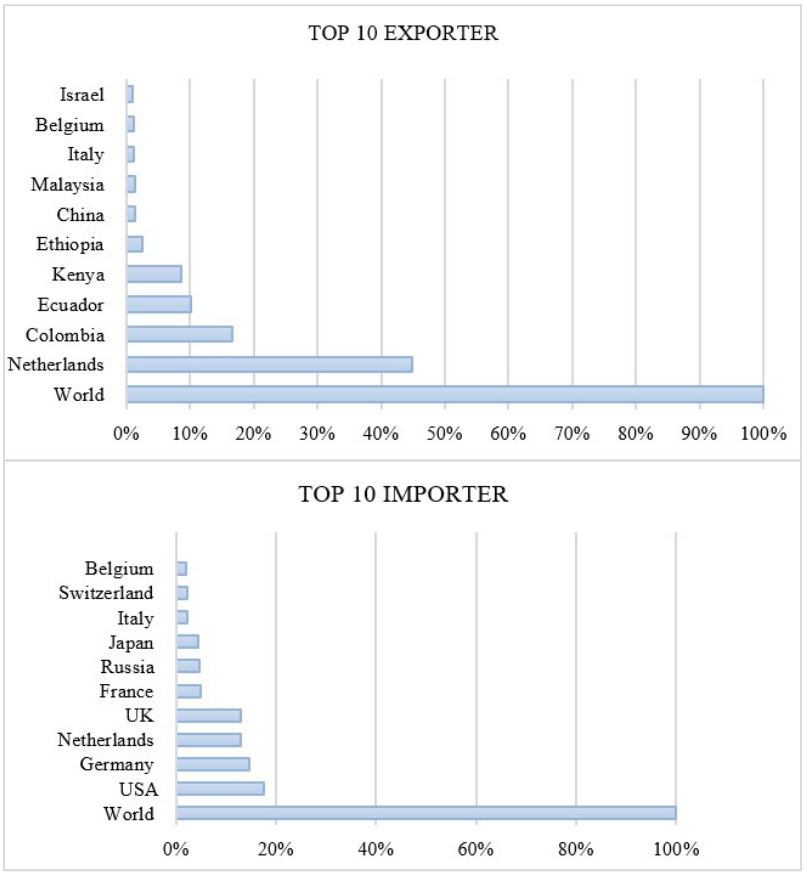
3.2.1. Development and major players

Floriculture, specifically cut-flower, is today one of the most dynamic global industries that connects developed and developing countries through production and trade. By the mid-2000s, the industry had evolved from a supply-driven regional market to a highly sophisticated and demand-driven global value chain (Labaste 2005). In the first half of the twentieth century, cut flowers were grown and traded only within developed countries. Patrick Labaste (2005:42) refers to this as an *immature market* in which flowers were mostly consumed for special occasions (weddings, funerals, and holidays) and to a lesser extent for own/personal use. Demand was met by the local or regional growers and specialised outlets, such as florists, which were in close proximity to consumers. Thanks to the continued prosperity of the global North, flower consumption increased rapidly and generated year-round demand. Although the growth was seen in both *special occasion* and *own-use* consumer markets, it was mainly driven by the creation of new demand for own-use. As a result, both specialised and unspecialised market segments continued expanding; the former refers to outlets that carry flowers and plants as their primary products, such as florists and web-shops, whereas the latter refers to outlets that carry flowers as one of their many different products/assortments, such as supermarkets.

The local/regional suppliers could not satisfy the new year-round demand due to rising production costs. Most consuming countries have an unfavourable climate for cultivating off-season flowers and adjusting the climate through technologies led to higher production costs. In addition, the costs were pushed up by rising wages and stricter environmental policies in those countries. Consequently, in order to increase

their profit margin, firms from rich countries moved some of their functions to countries with competitive advantages such as areas with agro-ecological potential (close to the equator), cheap labour and geographical market proximity. This move denoted a conversion of regional based trade into a global configuration through fragmenting activities and relocating them across different borders in the world. For instance, North American flower companies moved their production to Colombia and Ecuador, while keeping marketing and distribution centres at their origin (Sawers 2005; Arbeláez et al 2007). Similarly, European companies relocated to Sub-Saharan African countries such as Kenya, Uganda and more recently to Ethiopia. Such capital mobility and emergence of new production destinations was intensified by the increased liberalisation of policies and various bi-lateral and/or multilateral trade agreements since the 1960s.[9] As shown in Figure 3.1, the five major exporters are developing countries aside from the Netherlands, while importers remain advanced countries.

Graph 3.1. Top 10 countries of floriculture exporter and importer, 2016



Source: Author's construction based on the ITC's calculations (product: 0603[10]).

[9] For example, structural adjustment program, the U.S. Andean Trade Promotion and Drug Eradication Act, Cotonou Agreement- a non-reciprocal free trade agreement (Dolan and Sorby 2003; Patel-Campillo 2010; Keane 2013; Conlon 2015).
[10] In ITC and UN Comtrade database and product code: 0603 refers to Cut flowers and flower buds of a kind suitable for bouquets or for ornamental purposes, fresh, dried, dyed, bleached, impregnated or otherwise prepared.

Floriculture production consists of various types of plants such as cut flowers, foliage, potted plants, garden plants, flowering leafy plants and so on. After breeders develop new flowers, licenced propagators reproduce the varieties in the form of cuttings, seeds, or bulbs that can be an input for commercial production by growers located in various parts of the world. Breeding is one of the highest functions in the floriculture GVCs since it is capital and knowledge intensive, which makes high barriers to entry (Gebhardt 2014). It is largely controlled by advanced countries such as the Netherlands[11] and usually those breeding companies have experiment centres in important production regions. Similarly, commercial propagators and 'cutting' producers are largely owned by Western MNCs but increasingly operating in developing countries in the form of vertically integrated subsidiaries or sometimes in the form of joint ventures created between cutting MNCs and independent companies but controlled by the latter in captive GVC governance (Evers et al 2014). Overall, developing countries' participation in the floriculture GVC is predominantly in the production side and less so in breeding and commercial propagation. Production is the function in the floriculture GVC with relatively lower barriers to entry, in which supplier firms from low income countries participate. Occasionally, smallholder farmers insert in the GVC, often in the form of subcontracting or out-grower schemes producing summer flowers (Zylberberg 2013). The latter product seems to be the lowest function in the GVCs and unlike roses, summer flowers such as allium and carnations can be grown in open field without requiring capital and knowledge investment in relation to greenhouse technology.

Among the four groups of flowers: flower bulbs, cut foliage, cut-flowers and living plants, cut-flowers, particularly roses, are the most globally traded flowers, followed by living plants and flower bulbs, which are often traded within advanced countries (Rabobank 2015). The Netherlands is the leading exporter in all types of flowers, while developing countries largely export cut-flowers, especially roses.[12]

Colombia is the leading flower exporter among developing or poor countries. The country discovered its flower export potential in the 1960s as a result of Colombian and US entrepreneurs who combined their technical and marketing knowledge as well as investment capacity to launch a successful experiment, which was quickly imitated by many to create the export sector (Rhee and Belot 1990). The entrepreneurs also took advantage of newly introduced export policies and an economic cooperation program called Alliance for Progress that took place between the United States and Latin American countries, (Arbeláez et al 2007; Conlon 2015). Despite the protectionist efforts of the US growers, Colombian flower exports thrived, reaching US$ 1.312 billion in 2016, and exports to the US accounted for over 78 percent of the total value of global exports with the remaining share going UK, Japan, Canada, Russia, the Netherlands, and others (Mendez 1991; ITC 2016[13]). The success of the Colombian

[11] Dutch breeders account for more than 35 percent of all applications for community plant variety rights. See https://www.hollandtradeandinvest.com/key-sectors/horticulture-and-starting-materials/horticulture-facts-and-figures (last accessed on November 23 2017).
[12] In this paper, floriculture and cut-flowers/flowers are used interchangeably.
[13] See http://www.intracen.org/itc/market-info-tools/trade-statistics/ (last accessed on 3 November 2017).

flower sector is largely related to the role played by the association of Colombian flower exporters (Asocolflores) and innovation of entrepreneurs, alongside favourable government policies that helped to create a critical mass in the industry (World Bank 2006; Arbeláez et al 2007).

The Ecuadorean flower sector attempted to develop around the same time as the Colombian one, but it only become successful from the 1980s when a second phase of experiment took place. This was partly because the initial Ecuadorean flower firms were not able to tackle the logistic, infrastructural, and quality problems, as their counterparts in Colombia had done. Later, however, multiple national and global factors such as policy reforms, USAID support, and spillover effects from and linkages to Colombian exporters positively influenced the Ecuadorean flower sector, as did changes in the global market (Sawers 2005; Arbeláez et al 2007). As a result, flower exports from Ecuador reached over US$ 802 million, with the US as the main destination (48 percent) followed by Russia (14 percent) and the Netherlands (8 percent) (ICT 2016).

With regard to the Sub-Saharan Africa, the Kenyan floriculture industry plays a leading role. It was built based on the horticulture growing experience of the colonial period, where in the 1950s European farmers produced vegetables and fruits for export, primarily to United Kingdom. Later, the farmers began growing flowers but gained limited success to export markets, partly due to the absence of proper infrastructure and logistics (Whitaker and Kolavalli 2006). In the late 1960s, the sector was dominated by a single large Danish investment, but its success later attracted many European, Asian, and Kenyan investors. Since the 1980s, the sector has experienced growth as the government made some important interventions to support large scale investments and as investors exploited their existing linkage with European markets (as a result of horticulture exports), tariff advantages, and political affiliation (Ibid). Moreover, forming sector specific institutions, such as the Horticultural Crops Development Authority and Kenyan Flower Council, helped to resolve collective action problems and to bolster the sector. In 2014, Kenyan flower export value stood at US$ 553 million, with the Netherlands being the major buyer (52 percent) followed by the United Kingdom (19 percent). Countries like Australia, Russia and Germany are other important destinations of Kenyan flowers. In 2016, Kenya was the fourth largest cut-flower exporter worldwide and the largest in Sub-Saharan Africa followed by Ethiopia.

Ethiopia's floriculture industry that was pioneered in the 1980s by public owned horticulture farms and re-launched by domestic private firms in 1990s, successfully positioned itself as an important player due to the efforts of local entrepreneurs, targeted industrial policy, and development cooperation (see Chapter 4). As of 2016, Ethiopia exported US$ 191 million, with the Netherlands as the major destination (82 percent) followed by Saudi Arabia (4 percent), United Kingdom (3.6 percent), and Norway (3 percent).

As the trend of the major four exporters show, geographical proximity appears to influence the pattern of the global floriculture trade. The leading producers for Latin American countries largely cater to the

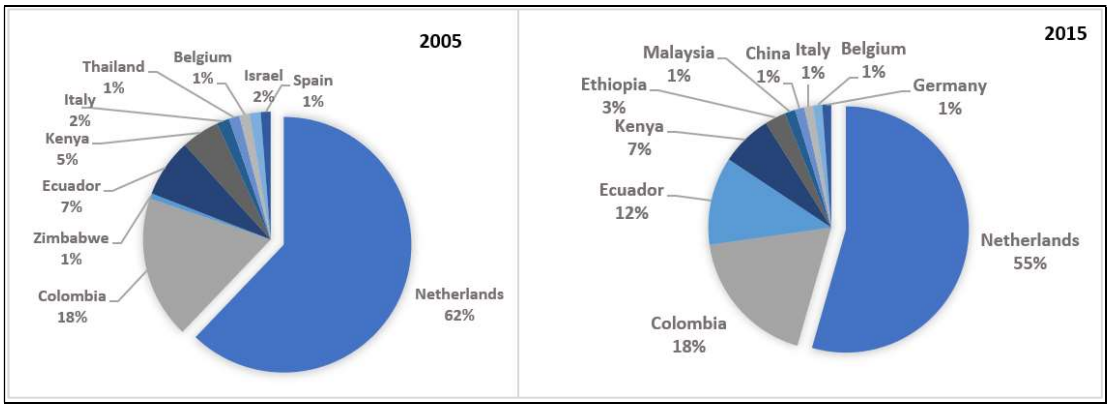
North America market, which is dominated by retailers and supermarkets that usually buy their flowers from importers and distributers located in or near Miami International Airport, the major entry point for Latin American flowers to the US market. Sub-Saharan African countries such as Ethiopia and Kenya mainly export to European countries, where their largest consumers and traders reside. Asian markets such as Japan are also largely catered to by regional players such as South Korea, Malaysia and China. However, Latin American and Sub-Saharan African countries have been entering Asian markets gradually (JETRO 2011; Rikken 2012). The Japanese market is dominated by wholesale markets located throughout the country, and recently its traditional auction system has been dwarfed by the growth of direct sales. Imported flowers are brought into the country by specialised importers that distribute it to wholesalers and retailers.

The Netherlands, the most dominant traditional producer and consumer country, traces the origin of its flower industry back to the tulip business in the seventeenth century, but the modern development is more directly linked with horticulture clusters of Aalsmeer and Westland. This is where Dutch farmers began growing horticulture in glasshouses and where they collectively (in cooperatives) established marketplaces (auctions) around the mid-nineteenth century (Gebhardt 2014). The successful development of the industry continued into the present period due to the efforts of actors in the clusters (innovations in hard and soft technologies ranging from production, marketing to distribution) supported by government policies (Tavoletti and te Velde 2008; Patel-Capellio 2011). In 2016, exports of cut-flowers stood at over US$ 4 billion and were largely traded within Europe (Germany 30 percent, UK 14.8 percent, France 12.5 percent, Belgium 4.3 percent) with a smaller share exported to Russia, US and other countries. The Netherlands also re-exports the flowers it imports from the major exporting developing countries mentioned above. The Dutch auction (presently Royal FloraHolland) played a central role in nurturing and disseminating network-based knowledge throughout clusters located in national as well as global level (Levelt 2010; Gebhardt 2014).

Notwithstanding the strong position of the Netherlands in the floriculture GVC, the role of the four developing countries has been increasing. As Figure 3.2 shows, in the period of 2005-2015, the export share of Ethiopia, Kenya, Colombia, and Ecuador has grown or remained stable, while the share of the Netherlands declined by 8 percent.[14]

[14] According to the Rabobank (2016), in the last decade, Ethiopia, Kenya, Colombia, and Ecuador have been taking the share of the Netherlands in global trade, and their aggregate export share (44 percent) surpassed the share of the Netherlands (43 percent) in 2015. However, this statistic should be used cautiously, as there appears to be some discrepancies in the data reported by different organisations (ITC, UN-comtrade and Ethiopian authorities). Rabobank's calculations were based on UN-Comtrade *data as well as* Royal FloraHolland and Rabobank data itself, but the export data of UN Comtrade differs significantly from the data that came from Ethiopian authority and ITC. While the data that came from the latter two sources are largely similar but UN-Comtrade's data showed an overstatement by more than 200 percent. The database is available here: https://comtrade.un.org/data/ (last accessed in November 2017).

Figure 3.2. Top ten cut-flower exporters of the world in 2005 and 2015



Based on ITC data for product 0603[15]

Global demand for cut flowers has grown consistently since the 1980s but then slowed in the aftermath of the global financial crisis that began around 2008 and affected all major consumer countries. Flowers are a luxury product, and thus they tend to be sensitive to changes in disposable income. Growth in the global floriculture trade continued to be unstable after 2009, and the large drop in flower consumption had not fully recovered by 2016 (Rabobank 2016). In some end markets, consumers switched to low value products such as short stem and small head size roses known as sweethearts, which benefited the unspecialised segment of the global market such as supermarkets and Do-It-Yourself (DIY) stores. Flower farms that produced intermediate and high-quality flowers for specialised segments, such as Ethiopian-owned flower firms, were adversely affected by the global financial crisis.

Additionally, with the increase in the number of flower exporting countries, the year-long demand is now met by an abundant supply, resulting in increasing pressure on profit margins and stiff competition worldwide. At the same time, buyers' requirements became more stringent in order to differentiate products as well as address perceived and/or real consumer concerns about safety and sustainability that emerged in the GVCs (Barrientos et al. 2003; Riisgaard 2009). Consumers and non-governmental organisations increasingly began demanding more information about the products they consume, including information on labour and environmental issues. These factors led to stronger chain coordination and control within the floriculture GVCs, which had important implications for supplier firms' capabilities and upgrading opportunities. As discussed in subsequent sections of the chapter, the degree of coordination and types of governance vary by end markets, sales channels, and market segments. The next section presents the main sales channels and market features with more focus on the chains in which Ethiopian-owned flower firms are inserted.

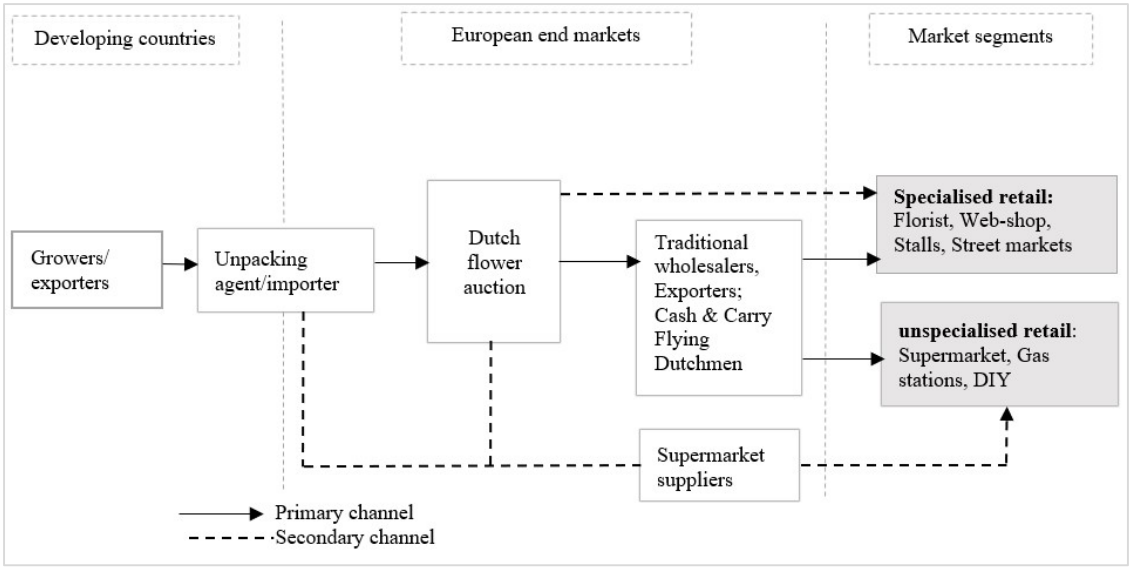
[15] The database is available here: http://www.intracen.org/itc/market-info-tools/trade-statistics/ (last accessed 21 November 2017).

3.2.2. Sales channels and market features

Although there are several floriculture auctions across the world, the Dutch Royal FloraHolland auction plays the most influential role. It is the largest flower auction in the world with an annual turnover of 4.6 billion Euros and trading around 60 percent of the worldwide cut-flowers and 40 percent of living plants in its four auction houses (Aalsmeer, Naaldwijk, Rijnsburg, and Elde) in the Netherlands (Royal FloraHolland 2016; USDA 2016). It is also the favoured market channel used by the specialised buyers (e.g. florists), which are dominant in Europe with a market share of around 66 percent (CBI 2015). However, as discussed below, the direct sales channel is rapidly growing in European and other end markets.

Figure 3.3. depicts sales channels through which flowers from developing countries reach European consumers in the EU and EFTA. As mentioned previously, consumers with special demands often buy flowers from specialised outlets such as florists and web-shops; whereas for their *own use,* consumers tend to buy (usually impulsively) from unspecialised outlets such as supermarkets and gas stations. In a simplified form, Figure 3.3 demonstrates the most common ways in which flowers from developing countries end up on the shelf of European florists and supermarkets. Exported flowers are received by an unpacking agent or import department of the auction and get processed and auctioned. Various types of big buyers (traditional wholesalers, cash-and-carry wholesalers) participate in the auction and distribute to specialised outlets (florists, flower web-shops, stalls, street markets). However, unspecialised outlets such as supermarkets also buy from the auction to supplement their direct sourcing or as their only source. Alternatively, unpackers or importers bypass the auction and directly get in contact with different unspecialised retailers such as supermarkets, gas stations and Do-It-Yourself stores (direct sales channel). Importers might also have direct contacts to specialised outlets such as traditional wholesalers and florists. The shortest supply chain can be achieved through direct sales when retailers like supermarkets skip importers and directly engage with exporters from developing countries to source flowers.

Figure 3.3. EU and EFTA sales channels for cut-flowers



Source: Adapted by the author from CBI (2015; 2016).

The evolution and market features of the two sales channels (the Dutch auction and direct sales) are closely intertwined, so they are discussed simultaneously. The Royal FloraHolland was established in 1912 by the cooperative of Dutch flower growers with the aim to increase the bargaining power of growers against the rising power of buyers. This led to a new way of organising the flower trade, moving from informal and individual-based transactions to a formal trade agreement with a guaranteed payment mechanism through a collectively established intermediary system: an auction (Patel-Capellio 2011). Through the auction system, small growers were able to enjoy safer and fairer trade terms than before. As a result, the cooperative began to grow quickly because it was able to attract a large number of members. Although buyers attempted to boycott the new system that eroded their power to dictate the terms of trade, an act of the Dutch government prevented this from happening. In 1916, the government enacted a rule that made using the auction system mandatory, which officially transformed the buyer-driven floriculture value chain into a producer-driven one (Ibid).

However, the Dutch flower growers were threatened again by the emergence of developing countries as important producer countries and in 1994 the Dutch government banned foreign products from the auction to protect Dutch growers. This resulted in a new dynamism in the GVCs as some of the banned firms, especially the East African Flower Company, a Dutch import firm and wholesalers reacted to the ban by setting up their own auction system, the Tele Flower Auction, near the Aalsmeer auction house (now Royal FloraHolland) with an innovative approach that used an electronic system and demonstrated a better capability of meeting buyers' requirement (Levelt 2010; Gabhardt 2014). Furthermore, such protectionist measures actually brought developing country producers and European buyers closer, encouraging direct sourcing especially between Kenyan and UK firms (Levelt 2010; Whitaker and Kolavalli 2006). This development was critical, not only in changing the relative position of the Dutch auction in GVCs and the growth of direct sales, but also in changing the strategies of the Dutch auction,

as a cooperative owned entity, negotiating the interest of growers, and that of the institution itself (run by professionals, not necessarily growers), which were sometimes in conflict (Gabhardt 2014). The auction was pressed by the competition to adapt and innovate. As representative of FloraHolland expressed "…if you want to continue as a hub of the flower industry, you need to accept growers from everywhere. You cannot turn your back on them, because they are already there, and if they are not with you, they are competition" (Ibid:226). Thus, with such rationale, the auction strategically encouraged international expansion of production, became more open to cater to the global supply (from members of the auction and non-members), and continuously upgraded its services in multiple areas of product assortments, marketing and distribution in a fashion that addressed buyers' requirements while positioning itself as a leading importer and (re)exporter. These changes resulted in an increased membership and strengthened the position of the Dutch auction in global trade, which was further consolidated through the merger of the two biggest auction houses, FloraHolland and Bloemenveiling Aalsmeer, that became Royal FloraHolland, and two years later, the Tele Flower Auction was integrated with Royal FloraHolland as well.

During this time, the direct sales channel continued growing, with strong control by a handful of large wholesalers and supermarkets, such as Tesco and Sainsbury's in the UK, Aldi and Lidl in Germany, Carrefour in France, and Royal Ahold in the Netherlands, which directly source from supplier firms in developing countries under their specific requirements. The growth of direct sales is stronger in the UK, where supermarkets have greater market share covering around 60 percent of total sales of cut-flowers and foliage. In Germany, Scandinavia and the Netherlands, the market share of supermarkets is about 20–25% (CBI 2017)[16]. Thanks to the competition with Tele Flower Auction, the Dutch auction (FloraHolland) appeared better prepared to cater to this trend as it introduced similar technologies and sales arrangements such as the remote buying system (KOA- Kopen Of Afstand),[17] or its latest version called FloraMondo, as early as 1996, which allowed registered buyers located anywhere in the world to buy flowers electronically based on product information. Moreover, the auction also set up a system that enabled direct trade alongside the traditional Clock system. Suppliers in Ethiopia call it auction-direct, recognising it as some sort of direct sales facilitated by the auction system. The auction continued introducing such services in order to cater to a wider range of buyers and to secure a sustainable supply. As the commercial manager of FloraHolland explained:

> "…around 80% of Africa's flower export goes to Europe and of which about 90% hits the Dutch system because it is so efficient and accessible…we provide space at our auction houses with all logistical support

[16] The information about market trend by CBI is available here: https://www.cbi.eu/market-information/cut-flowers-foliage/trends (Last accessed November 2017)

[17] Although KOA was introduced in 1996, its use has significantly increased since 2006. http://www.floraculture.eu/2007/04/disconnecting-the-product-from-the-process-only-the-beginning/. A renown sector specific magazine called Flora Culture International published, on 26 April 2007, an interview with a manager at Bloemenveiling Aalsmeer auction (one of the two largest Dutch auctions before the merger in 2008), who explained how the importance of KOA dramatically increased after several years of its introduction.

> making it a platform where goods can come, be processed and distributed in most efficient and easy ways possible…nowadays we are slowly moving the physical concentration at the auction into concentration in cloud. Meaning, digitalisation is making logistical facilitation more flexible and efficient - roses from Nairobi can be virtually auctioned and directly routed to Moscow, Istanbul or New York without coming to Amsterdam"[18].

This indicates that the digital revolution might increasingly reduce the comparative advantage of Africa that emanates from its geographical proximity to Europe, but according to the manager of FloraHolland, the auction still predicts that African countries will remain the major 'production garden' to European demand for flowers. This is because there are limited numbers of countries with suitable agro-ecological conditions which result from close proximity to equator and altitude, so digitalisation can only lead to limited substitution of production location. Therefore, as the manager highlighted, the auction will focus on its competence and, as a cooperative, will continue serving the interest of its members by providing them a "marketing platform, guaranteed payment system, and dependable logistics that suits the future markets".

In the Dutch auction, the price is determined by the so-called auction Clock system, which is a pressure game where the clock begins at the highest price (given by the auctioneer depending on demand and supply) and then starts counting down. Buyers have only a few seconds to stop the clock in order to purchase specific amounts of the auctioned flower, otherwise they risk losing their preferred product of specific quality and quantity. Therefore, a supplier/exporter can sell different batches of the same variety of flower at different prices to various buyers. However, in auction-direct, buyer and seller can agree on a price outside the auction clock. As Ethiopian-owned firms explained, auction-direct provides an opportunity for contract-based selling with both fixed and flexible prices. The two parties set fixed prices for a certain variety and volume of flowers, while for the rest of the flowers they agree to apply the daily price of the auction. In the case of direct sales, prices are often negotiated by the buyer and seller, but both tend to use the auction price as a reference. This can be different for long-term partners who might set prices based on a 'cost-price plus' mechanism, which means setting prices based on the sum of all costs (breakeven point) plus a certain percentage of the total cost (mark-up) (Van der Maden et al 2012). In principle, the auction sells all types of flowers with a wide range of quality, but in practice it is suggested to be a better channel for high value products often needed by specialised segments. As a result, roses of large and intermediate head size and stem length tend to fetch better prices in the auction than in direct sales. But, the direct sales channel is also showing increasing demand for high quality roses (CBI 2015).

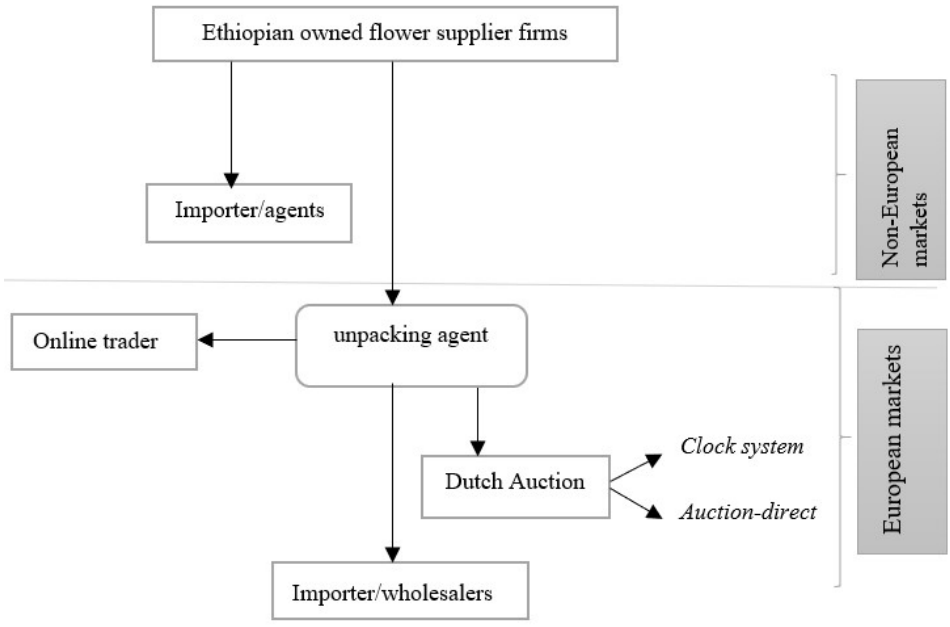
The two sales channels are not necessarily separate and their interdependence can be seen more clearly in online trading. One can find the two channels playing complementary roles and cooperating in areas

[18] Interview with commercial manager of FloraHolland, East Africa, October 2017.

where one would expect the two to be competing. This seems to be part of upgrading processes in line with the auction's strategy to embrace the inevitable change in the global value chain and hence adjust to a rapidly emerging trend: online trading or the virtual marketplace. As the interviews with online trading firm reveals, online traders claim to have a strong capability to predict a daily auction price so that they can offer in advance a slightly higher price to suppliers that are connected with it via its online platform. The supplier decides to permit the online trader to start selling part of its daily shipment via its web-shop before it is even shipped to Europe. If the online trader was unable to sell the entire agreed amount by the time the shipment arrives, the unsold flowers go directly to the auction, and the online trader pays for the sold amount via the auction payment system. Although the online trader is directly competing with the auction, it is doing so with the cooperation of the auction by sharing one of its most important competitive advantages: a fast and guaranteed payment system, which is a highly valued service in the eyes of supplier firms. However, the auction seems to be slowly bringing those online traders under its virtual marketplace of FloraMonda, which indicates the dynamic capabilities of the auction to safeguard its position as global hub to the industry.

As Figure 3.4. shows, Ethiopian-owned flower firms sell in both traditional (European or Western) and emerging (e.g. Middle East) end markets; in the latter they use the direct sales channel, while in the former they use both the auction and direct sales. In addition to processing flowers for the auction, the unpacking agent plays multiple roles facilitating sales in direct sales and online trading. Online trading is an important market channel for local firms in the Ethiopian floriculture industry.

Figure 3.4. Simplified market channels for Ethiopian-owned flower firms



Source: Created by the author based on the data from the survey and interviews with market actors

The floriculture GVC literature generally focuses on analysing the two sales channels as depicted in Figure 3.3 where developing countries producers supplying Western consumers, and the direct sales channel is predominantly conceptualised from the perspective of supermarkets in Western countries (Riisgaard and Hammer 2009; Gebreeyesus and Sonobe 2009; Taylor 2011; Zylberberg 2013). This is not surprising due to the dominant role of Europe in the global industry as well as in trading with developing countries. But there are other types of buyers in the direct sales channel that are growing in importance for smaller supplier firms that largely produce for specialised market segments, so it is necessary to go beyond the conventional focus on supermarkets and to examine direct sales in the context of other buyers in traditional end markets as well as in emerging markets. For instance, as presented in Table 3.1. below, the Netherlands is by far the largest market for Ethiopia's flower export, followed by Saudi Arabia. Although there is no disaggregate data by sales channels, the trade with all countries takes place through direct sales channels except for the Netherlands where the auction is dominant. Unfortunately, there is no data that show the share of direct sales channels, auction channel as well as sub-channels like clock system, auction-direct and online trading.

Table 3.1. Ethiopian flower export of Ethiopia by market destination - 2015

Market destination	Export volume share (%)	Export value share (%)
Netherlands	84.2	80.3
Saudi Arabia	4.9	4.4
Norway	2.6	2.4
United Arab Emirates	1.6	1.4
Germany	1.3	2.7
United Kingdom	1.2	1.1
Japan	0.9	1.1
United States	0.9	2.3
South Africa	0.4	0.4
Belgium	0.4	1.3
France	0.4	0.6
Italy	0.4	0.6
Oman	0.2	0.2
Kuwait	0.1	0.1
Canada	0.1	0.5
Australia	0.1	0.1
Russian Federation	0.1	0.0
Total	99.7	99.6

Source: author's calculation based on data obtained from EHDA

The market in the Middle East is dominated by specialised importers who create links with producers/export agents in different parts of the world and supply to local wholesalers and retailers (CBI 2016). Although there is no consumption data on the Middle East market, CBI's interview-based

research predicts growth in flower consumption due to a young and growing population with higher income per capita, especially in the United Arab Emirates which is a trade hub for the region (via Dubai flower centre). The trade data also shows that in 2016 the region imported flowers valued at US$ 150 million, with over 60 percent of it going to Saudi Arabia and United Arab Emirates, and that flower imports increased 85 percent compared to imports in 2012 (ITC database). Uncovering these dynamics is important for understanding the contemporary floriculture GVC, as it denotes growing demand in the global South and alternative outlets for producers in developing countries. In addition, traditional wholesalers are increasingly leaving the auction to engage in direct sales channel. As mentioned previously, these wholesalers are typically the suppliers to specialised retailers such as florists, gardening centres, street markets and web-shops, which are dominant flower outlets in Europe.

According to the survey of Ethiopian-owned flower firms, some of these wholesalers engage with them in contract-based sales where the price is sometimes fixed and costs are lower than in the auction, since it passes through the same process but without auction fees. The Middle East end market usually involves lower costs and sometimes offers better prices compared to the European market. For instance, in the auction channel suppliers are responsible for ground transportation of flowers from the airport to the auction house; whereas in the Middle East the responsibility of the supplier is until the airport of the destination country and sales are usually based on contracts with fixed price. But since there is no system that can guarantee payment for suppliers, sales are only based on advance payment until a certain level of trust is established. This indicates that suppliers who engage in such diversified end markets/ sales channels are exposed to different prices as well as opportunities to learn and build their capabilities, but each has its risks and challenges. These issues are explained in more detail in the next part of the chapter.

3.3. Governance and upgrading in floriculture global value chains

As discussed in Chapter 2, in global value chains where chain actors and activities are organisationally and spatially dispersed, governance is key to bringing products from production locations to consumption. Governance is the art of re-integrating globally fragmented functions and creating a competent supply base through various coordination, control, and normalisation mechanisms.

The floriculture GVCs is largely identified as buyer-driven chain, in which 'lead firms' such as the Dutch auction, retailers and other big buyers set requirements and standards that needs to be met by suppliers in order to improve their competitiveness as well as to comply with public and private regulations. These requirements and standards dictate to a different degree what, how, and under what conditions to produce, sell, and deliver. Suppliers strive to meet those requirements and standards in order to sell their products. In some nodes, buyers and suppliers work more closely in non-market coordination, which often increases opportunities for learning by suppliers. In the case of the auction GVC, where suppliers from developing countries are inserted, its major governance takes place via the

institutional rules of the auction, which are largely considered as market-based governance and serves as a minimum standard for the entire floriculture GVC. However, as the empirical evidence of this thesis revealed, there is another layer of governance in the auction GVC that is exercised between unpacking agents and supplier firms which seems to be ignored or underestimated (implicitly) in existing floriculture GVC literature. Before elaborating this argument, I discuss the major factors that shape governance in the floriculture GVC.

3.3.1. Factors shaping governance

As noted earlier, governance in these chains is influenced not only by chain-actors, most importantly lead firms, but also by non-firm institutions such as national legal requirements, international regulations, and sustainability initiatives. In the floriculture GVC, two national and international legislations are identified as the most important in shaping the chain governance. The first one is legislation on plant health, which specifies phytosanitary requirements of plants that can enter specific countries or markets. For instance, flowers that are exported through either of the market channels to European markets need to comply with phytosanitary requirements, requiring that exporters get phytosanitary certificates from the National Plant Protection Office (NPPO) in exporting countries, which is internationally designated to issue the certificate. Some countries apply this rule more strictly than others. For instance, local firms in Ethiopia indicated that Japan and certain states in the US have near zero tolerance for pests and often require fumigation, whereas enforcement of such regulations can be weaker in the Middle East.

The second regulation is concerned with intellectual property rights. Plant breeders are protected by the International Union for the Protection of New Varieties of Plants (UPOV). Member countries are required to provide legal instruments to enforce breeders' rights. However, the enforcement of the regulation differs across member and non-member countries. For instance, Western countries tend to observe it more rigorously than countries in the Middle East. The Dutch auction protects the intellectual property rights of breeders by preventing market access to suppliers who do not pay royalties. Producing countries are also advised to observe breeders' rights, but Ethiopia has no laws to regulate these rights and according to some key informants in the Ethiopian flower sector, the absence of such regulation has had negative impacts on the sector, as it discourages breeders from selling their best varieties in the country, while it encourages variety theft by some growers who sell on unregulated markets.

Apart from national enforcements, breeders exercise the right to control their varieties and 'proper' usage. In doing so, they shape supply and demand, and hence price, through managing access to varieties. For example, they issue varieties only to preferred growers in exclusive agreements for a certain period so that the demand of those varieties exceeds the supply enabling both the breeder and the firms to enjoy higher returns on their investments. Apart from such buying power, relationships and trust are believed to play important roles in accessing varieties (Levelt 2010; DLV Plant 2012).

The Dutch auction (including online traders) has minimum requirements or institutional rules regarding pre-treatment, quality, bacteria content and ripeness (opening stage) of flowers. Part of these rules emanate from national legal requirements related to plant health, while others are product specific and geared towards meeting market requirements. Flowers that meet the minimum requirements are then sorted in different quality groups. For example, rose sorting is done based on length, weight, and maturity. Growers are responsible for self-grading and for the reliability of the information they provide with their flower lots. While the auction makes random checks in relation to meeting minimum requirements, the importing department unpacks the flowers and ensures that the supply meets the basic professional level of the auction. Anyone can sell via the Dutch auction, but they are required to pay auction fees. If supplier firms are members of the auction, the fees might be lower, but they are obligated to sell all their production via the auction channel. Otherwise, they are subject to pay the so-called NAT commission (commission on non-auction turnover). In other words, if flower supplier firms who are members of the auction choose to sell part of the export in another channel, they need to report their turnover sold in non-auction channels and pay commission on it to the auction. As explained by the East Africa's representative of the Dutch auction, in order to enforce this rule of the auction, the regional representative office regularly visits member farms and estimates the export volume of each farm. If the actual export volume via the auction significantly deviates from the estimation, the auction can initiate an investigation and demand a member farm to settle the outstanding commission (if any) or block it from the auction and membership until the amount is settled.

Besides the institutional rule, there are certain rules at the auction that overlap with specifications in the direct sales channel, such as compliance for certain sustainable initiatives or certifications. Furthermore, the auction's rule dictates that supply and demand determines auction prices. However, in practice, prices can be influenced by the capabilities of a supplier to appear regularly at the auction clock with consistent quality and volume, unless it is a special occasion such as Valentine's Day or Mother's Day when often demand exceeds supply and all suppliers enjoy relatively high prices. Suppliers with a good track record in consistency and reliability have a better chance of establishing direct relations with buyers (like in the auction-direct channel) and negotiate the prices.

The specifications of buyers in the direct sales channel depend on their end markets and market segments. Generally, buyers' specifications in the Middle East are not as extensive as in Western end markets, and there is a stark variation in consumer taste between the two regions that shapes buyers' requirements. As the survey revealed, for instance, buyers in the Middle East prefer classical varieties of roses at relatively matured stage or higher opening stage (e.g. stage 4), while the Western markets require roses of early opening stage (opening stage 2).[19] In the Western direct sales channel, targeting

[19] Opening stages refer to the maturity level of roses. Roses with an early opening stage (stage 2) have a tighter flower head with less visible colour and it opens slowly and can have longer vase life, while the opposite is the case for roses with an advanced opening stage (stage 4).

both specialised and unspecialised market segments, product quality requirements are generally the same as in the auction, but retailers usually have additional specifications such as guaranteed vase life, quantity per variety, and packaging specifications (DLV 2012; CBI 2016). Moreover, reliability and consistency are more strictly required along with flexibility, but these attributes are important in the Middle East market as well, especially with big buyers. Such specifications can be considered as a precondition to engage in direct sales channel, especially to Western retailers. Flowers with buyers' specifications in terms of varieties, quality, and quantity should be delivered at a specified time and place so that buyers/retailers can cater to consumers with fresh flowers without having a need to store them. This means that managing lead-time (the time between placement of order and delivery of products at retailer's shelf) is more crucial in the direct sales channel (especially for supermarkets), which implies that supplier firms need to have a strong capacity in process planning (production to delivery) and logistics capabilities that enable them to control the 'push-pull' forces simultaneously: pushing out shipments from exporting country and pulling in to end markets (Labaste 2005).

Moreover, suppliers need to be flexible, since buyers' specifications can change frequently. As a result, buyers in Western supermarkets tend to be involved in value chain coordination and work closely with suppliers to improve logistics and cool chain management. Large supplier firms may even prefer setting up a vertically integrated system through joint ventures with freight forwarders and opening their own importing, marketing and distribution centres at end markets (Labaste 2005). As mentioned before, however, there are other types of direct buyers in the Western direct sales channel that target the specialised market segments, such as traditional wholesalers whose requirements usually overlap with the Dutch auction but have some similarities with European supermarkets as well, especially in requiring, consistency, reliability, and consumer labels (certificates).

Sustainability initiatives and certification are important governance mechanisms in the floriculture GVC. There are various types of environmental and social standards but MPS-ABC and GLOBAL-GAP, which are business to business (B2B) standards, are the most widely adopted. Their primary concern is good agricultural practice and environmental protection, but MPS has incorporated social issues through MPS-SQ (Socially qualified). The other standards are commonly known as consumer labels to imply that, unlike the B2B, they are communicated to consumers, and these include labels such as Fair Flowers Fair Plants (FFP), Flower Label Program (FLP), Fairtrade Labelling Organization (FLO), and Ethical Trade Initiatives (ETI). Most of these standards cover more (sometimes exclusively) social issues than B2B standards, while at the same time addressing environmental concerns (Riisgaard 2011).[20] Furthermore, a new initiative called the Floriculture sustainability Initiative (FSI), is to be launched by 2020 to make 90% of world flowers and plants responsibly produced and traded. The initiative is also known as FSI 2020 and intends to benchmark around several standards active in the

[20] As mentioned on their website, Fair Flowers Fair Plants (FFP) label has stopped since the end of 2017 because of insufficient market. http://www.fairflowersfairplants.com/en/home-2/ (last time accessed December 2018).

sector including the ones mentioned above and local sector standards in developing countries as well as others. All major players including Ethiopia are part of this initiative[21].

The two main sales channels have different approaches towards certifications. The auction does not officially require certification but most of its suppliers are certified for MPS-ABC, which was developed by the Dutch growers. The auction also displayed the Flowers Fair Plants consumer label on the auction clock, which means that it is communicated not only to buyers at the auction but also to consumers at florists or retail stores, thereby creating room for product differentiation for both suppliers and buyers. Therefore, suppliers appear to be encouraged to comply with different certifications to build their reputation. In the direct sales channel to Western end markets, suppliers are usually required to take on different standards, especially consumer labels. In doing so, buyers and suppliers can differentiate products and expand their reach into niche markets such as organic and Fairtrade. However, according to Ethiopian-owned firms, direct sales to the Middle East and some Southern European countries do not require compliance with sustainable initiatives as widely as the traditional markets in Europe and North America.

Compliance with such standards requires considerable investment in setting up management and organisational systems that enable implementation and monitoring of issues like good agriculture practice, labour conditions, hygiene, and safety. There are also recurrent costs related to monitoring and control. Sometimes, the cost increases with the number of certificates as each of them requires different monitoring mechanisms and audit protocols. But at the same time, adopting certificates to a certain extent can enable suppliers to improve product and production processes alongside improving access to different end markets and segments. Concurrently, some standards provide mechanisms to organised labour that can be deployed to negotiate regulations and achieve social upgrading (Riisgaard and Hammer 2009). In 2010, 28 of the total 77 firms in the Ethiopian floriculture industry adopted one or more of these international standards, but MPS was by far the most dominant certificate (Gebreeyesus 2014). Similarly, the data that I collected in 2016 shows that of the 11 actively exporting Ethiopian-owned firms, nine of them reported to be certified at least for MPS-ABC and among these, four of them were certified for both business-to-business and consumer labels. Table 3.4. summarises the general criteria and processes that are required to be certified for business-to-business standards such as MPS-ABC and GLOBALGAP as well as consumer labels such as FFP and Fairtrade.

[21] The website of FSI2020 provides detailed information about the initiative: http://fsi2020.com/ (Last accessed in March 2019).

Table 3.2. Capabilities required to get Business-to-Business and Consumer labels

B2B CERTIFICATES	CONSUMER LABELS
▪ Computerised database system ▪ Higher management capacity ▪ Stronger monitoring and control system ▪ Ability to appropriately use, regularly measure, and record performance related to consumption of water, energy, pesticide, and fertilisers ▪ Proper waste management and disposal procedure ▪ Proper safety system and hazard prevention ▪ Storage and inventory system ▪ Basic workers' health and safety (provision of protection equipment-glove, uniform, protective shoe, etc.)	▪ All or most of capabilities required for B2B ▪ Human resource policy and record keeping ▪ Social compliance monitoring system ▪ Observing local and international regulations (e.g. national labour and social protection regulations, ILO labour standards) ▪ Regularly training labour force ▪ Allocating time and resource for active labour union, premium committee ▪ Paying sufficient wage to cover basic needs ▪ Conductive working environment (clean and separate toilet, canteen, changing space, uniform, gloves, etc) ▪ Emergency health care service (first aid facility) ▪ Gender sensitive labour conditions (sexual harassment prevention policy, maternal leave, child care facilities, etc.)

Source: Based on Riisgaard (2011)

3.3.2. Governance in floriculture GVC

Studies of floriculture GVC generally identify governance in the auction channel as market-based, which is characterised by loose relationships between buyers and suppliers; whereas direct sales, especially driven by European supermarkets, is perceived as strongly coordinated and is considered as relational network governance (Wijnands 2005; Riisgaard and Hammer, 2008; Gebereeyesus and Sonobe 2009; Zylberberg 2013). These studies base their argument on some of the factors or requirements discussed above, but without providing a detailed analysis about the chain governance at the auction. The exception is Wijnands (2005), who argued that the complexity of the transaction in the auction channel is low, since the specifications are straightforward with a higher codifiability of product and processes. Thus, Wijnands concluded that governance at the auction is market-based and might move to modular, but in both cases switching costs remain low. However, Wijnands only took into account the institutional rules of the auction and did not consider the role of the independent unpacker, who is often hired by suppliers from developing countries to be a *gateway* to successful insertion in the auction channel GVC. Similarly, Taylor (2011) argued that governance in the floriculture GVC generally is trust-based, but in the auction channel, it can move back to market-based when a breach of trust occurs. However, his

analysis focused on the level of exchange and did not look at inter-firm relations and their effect on suppliers' capabilities.

Meeting institutional rules of the auction is not sufficient to be successfully inserted into the auction channel. It is also important to ensure consistency in quality, volume, and presence at the auction (reliability) as well as to comply with certain sustainability initiatives. These in turn increase the complexity of the transactions. Moreover, although to a certain extent the knowledge and information in the floriculture GVC can be codified, as it is agriculture, growing flowers necessarily involves tacit knowledge such as adapting and modifying seeds for specific agroecological conditions. Even if one ignores production level dynamics, there is tacit marketplace knowledge that requires close interactions and learning-by-doing, even when suppliers have a high level of production capabilities, as is the case with Dutch growers in the Netherlands (Levelt 2010). Furthermore, as Gebhardt (2014) argued, the Dutch auction is ideologically and structurally built on a network and succeeding in the flower business requires being part of such network. The evidence from Ethiopia also supports these arguments, particularly in regard to the governance in the auction channel at supplier-unpacker nodes.

The governance at initial entry of supplier firms to the auction GVC can be considered market-based, since the Dutch auction is easily accessible for suppliers with a broad range of capabilities. The auction, as a cooperative, provides an in-house unpacking service, aiming to increase the accessibility of the auction channel to relatively small size supplier firms that do not have a capacity to hire a private unpacking firm and/or to provide a neutral option for suppliers that might feel power asymmetries with an independent unpacker. But the service is very basic: the importing department refreshes the flowers to ensure minimum level of presentation at the auction and communicates the auction's remarks and transaction details back to the suppliers. However, as suppliers commit to improving their position in the business, they move away of this market-based governance node of the auction GVC and hire an independent unpacker with whom they enter a new relationship that can take them beyond accessing the auction and enable them to gain competences that are necessary to receive a better price. Suppliers, like the Ethiopian-owned flower firms who were new to the industry, have limited opportunities to capture a better deal in the auction channel unless they continuously build capabilities in close relationship with unpackers. It is important to note that all suppliers in developing countries are not uniformly inserted in the auction GVC. For example, Dutch-owned flower firms operating in developing countries usually have their own subsidiaries at the auction that process their flowers (including unpacking) and do marketing; whereas Ethiopian-owned firms hire private service provider (unpackers or agents) to get those services and although the primary role of the unpacker is to process the flowers, it is not limited to it.

As indicated in Figures 3 and 4, unpacking agents are placed in between suppliers and the auction. Unless the supplier has its own unpacking unit (subsidiary) based at the Dutch auction or there is

equivalent service in a local market such as in Kenya or the supplier uses the auction's import department, it needs to hire an unpacker to sell via the auction.[22] Conversely, the business of unpacking is dependent on such suppliers, as it is not engaged in direct production and it works on commission which increases with the volume of flowers unpacked and processed. Due to this mutual dependence, the two parties closely interact and coordinate to strengthen suppliers' position in the auction channel and capture higher returns for both actors. For instance, apart from their daily communication, Ethiopian-owned firms and their unpackers frequently interact face-to-face and work at production sites to improve production processes and marketability of the flowers. Their relationship largely resembles what is expected in relational governance but here the capabilities of supplier are not as high as expected on those type of governance. As the capabilities of the supplier develop and as basic tacit knowledge is mastered, the relationship between the supplier and unpacker deepens; they exchange information and knowledge about new market dynamics and how to capture value therein. In this chain, modular governance seems unlikely since both face high switching costs, since building such relationships and trust is difficult and requires a long time. Moreover, unpackers can maximise gains by retaining competent supplier firms that need less coaching and their products need less re-sorting and re-grading. Similarly, as supplier firms have limited social and spatial proximity to the market, they need a well-situated unpacker to get not only quality flower processing services but also a trusted gateway to the dense and socially embedded network around the auction channel.

According to interviews with an unpacker at the Dutch auction, developing trust between the supplier and the unpacker is key to achieve their mutual success. In turn, this is contingent on their close coordination and relationship, including important decisions and activities. For instance, they coordinate and consult each other about advance planning of shipments, promotion and marketing strategies and deciding on which activities to do where (for example, higher value can be captured, or cost can be reduced if some flowers (short stem) are packed at the supplier end while others at the unpacker end). Similarly, the importance of embedded networks and trust was emphasised by *online-traders* at the Dutch auction. As they explained, in conjunction with suppliers' competence, trust is key for a better price, fixed contract and long-term relationship between *online-traders* and suppliers. Apart from that, suppliers track who is buying their products on the auction clock in order to establish direct contacts that can pave the way to personal relationships and hence to direct trade (*auction-direct*). As discussed above, such moves usually require greater capabilities demonstrated by consistency and reliability in the auction clock.

However, the interest of the unpacker and the supplier tend to conflict when the latter attempts to diversify its sales channel and/or end markets, because such moves affect the position of the supplier at

[22] Some Dutch importers/unpackers moved to Kenya and became exporters without necessarily growing themselves. They operate as intermediaries between producer and market. But in Ethiopia such kind of intermediary function is not legally permitted (see Chapter 4).

the auction, since it will make it extremely difficult to maintain consistency. Even within the auction channel, the unpackers think that diversifying away from the traditional auction clock into sub-channels like auction-direct and online traders is not the best option. According to one unpacker,

> "The buying game at the auction is a pressure game…buyers must be in pressure to push the button. Often direct buyers at auction (*auction-direct*) are the same one you sell in the auction, by selling them part of your product directly, you lower the pressure to push the button on the clock, then buyers are relaxed so price drops". As the unpacker further explained, "…buyers are lazy, and their laziness has advantage and disadvantage for firms. The advantage is if they already have a supplier they know relatively well, they don't want to look for a new supplier for a few cents difference. On the other side, if the supplier is not consistent, they easily switch to a new supplier following the advice of their provider or agent who buys for them at the auction"[23]

Nevertheless, taping on the set of capabilities developed through such relationships in the auction channel enables suppliers to diversify to other end markets, such as the Middle East, where suppliers gain relatively better bargaining power, higher price, and/or lower cost, especially if they secure the right contacts and network in the business. Governance in the Middle East value chain can be considered as market-based, but this is not necessarily in the sense of arm's length relations. In fact, personal networks and trust are essential in this end-market chain, but it has little contribution towards developing the technical, organisational and managerial competence of suppliers. Rather, building trust-based relations and networks alongside flexibility are essential to guarantee payment as well as to secure long-standing contracts with reliable buyers and to expand market positions. As one Ethiopian-owned firm owner put it:

> "…in the Middle East purchasing capacity is already there, it is only about expanding the habits of consuming flowers; now that is also coming up…the nice thing , unlike Europe, the consumer in the Middle East do not purchase flowers anticipating two weeks vase life, it might be just for a day so they buy frequently and they care less for slight mechanical damages…plus they don't care that much how you produce it as long as you deliver the product they ordered…."[24]

However, according to CBI's market study, there is rising consciousness in the Middle East regarding sustainable initiatives, albeit small, and some buyers favour supplier firms with international business standards as it reflects their professionalism (CBI 2016). Such diverse governance structures in the floriculture GVC have implications for suppliers' strategy for learning and upgrading.

[23] Interview with unpacker at FloraHolland auction, Aalsmeer, the Netherlands, October 2016.
[24] Interview with an Ethiopian flower firm owner, Addis Ababa, Ethiopia, July 2017.

3.3.3. Upgrading in the floriculture GVC

Upgrading in the GVC was originally conceptualised based on non-agricultural industries and as discussed in Chapter 2, it has four conventional typologies: product, process, functional, and inter-sectoral or chain (Humphrey and Schmitz 2002). Ever since, the concept has been further developed by many scholars that found the fourfold typologies inadequate to explain real-world patterns and the complexities of upgrading revealed in various sector GVC (see Chapter 2). Similarly, the conventional conceptualisation of upgrading cannot be strictly applied in floriculture, as some of those categories are interdependent and thus difficult to classify distinctively. For instance, in floriculture, product upgrading can be achieved without necessarily requiring a move to more sophisticated products, but rather as a direct result of improved production processes. Moreover, as flowers are highly delicate and perishable products, their ability to earn a good price depends on improved processes beyond the production stage, such as cool chain management and logistics. However, some of such measures can be considered process upgrading but do not necessarily lead to improved efficiency and might just be to comply with buyers' requirements.

In the floriculture GVC literature, selling via the direct sales channel is perceived as an indicator of firms' higher capabilities or upgrading (Gebereeyesus and Sonobe 2009, 2012), but this may not necessarily lead to higher prices. As Evers et al (2014) found in the Ugandan flower sector, suppliers in the direct sales channel faced a continuous decline in prices and profit margins. As a result, some suppliers switched into cuttings (chain upgrading), while others sought to switch to vegetables and fruits to sell in regional supermarkets (chain/inter-sectoral downgrading). Regarding social upgrading, the trend in the Ugandan flower sector shows that the growing competition and stringent requirement in direct sales channel can lead to both economic and social upgrading in one chain but to mixed result in the other. For example, in 'cutting' GVC firms, vertically integrated new functions for growing testing varieties added new products, invested in more efficient technologies and increased their production and revenue. Whereas in cut-flowers GVC (small headed rose farms), firms faced economic downgrading as their production declined or remained stable and their profit margins were squeezed. In relation to social upgrading both cuttings and cut-flower firms showed positive trends, as workers experienced higher wage and better working conditions primarily due to trade unions, Collective Bargaining Agreement, and national and international NGOs that ran successful campaigns in Uganda and in Europe treating all floriculture farms as if they were in the same value chain (Ibid).

Similarly, Barrientos et al (2015) moved beyond trade between the global North and South and studied the regional dynamics of African horticulture value chains. They uncovered the trend of 'strategic diversification' as means of capturing higher value. Firms operating under different governance structures at global, regional, and domestic levels might capture more value and enhance their bargaining position vis-à-vis their European buyers through strategic diversification or 'end market upgrading'. Factoring in the costs of transport and compliance with requirements, a competitive net price can be

achieved in regional markets for similar quality products. Strategically diversifying to non-European end markets (regional and domestic) tends to lead to higher benefits for producers who have export experience in the European market as they already possess the capabilities to meet requirements that are just emerging or yet to emerge in the regional and domestic end markets. In general, Barrientos and her colleagues found both economic and social upgrading where firms and workers have the capabilities and skills to upgrade and can find new opportunities. Strategic diversification into global and regional end markets with different standards and requirements is enhancing the bargaining positions of producers and workers in some contexts. However, commercial pressures on suppliers long identified in global supermarket value chains reverberate in those of regional supermarkets. Combined with rising costs and wider labour market pressures, suppliers with poor capabilities, low-skilled casuals, migrant workers and unorganised smallholders face downgrading pressures or can be excluded from GVC altogether (Ibid:13).

Local firms in the Ethiopian floriculture industry also follow diverse trajectories of strategic diversification and upgrading and downgrading. As discussed in Chapter 5, most of the firms sell in Western European end markets, while at the same time diversify to Southern European, Middle Eastern, and (to a lesser extent) to Northeast Asian end markets, as the governance in each end market/market channels provides various opportunities to capture higher value or to secure a better deal.

3.3.4. Floriculture GVC Technological Capabilities Matrix

The above discussion in this chapter showed numbers of functions or nodes in the floriculture GVC requiring various levels of capabilities in order to meet the standards demanded in different sales channels and end markets. Based on that, the technological capability matrix for the floriculture global value chains is constructed and presented below in Table 3.5. Following Lall, the horizontal categories include investment, production, and linkages, but the latter two have been elaborated upon to include the sub-categories: process and product (production) as well as supply chain, inter-firm relations, and logistics and finance (linkages). This can be linked to process and product upgrading as well as supply chain and end market upgrading, as discussed in Chapter 2. In terms of complexities (vertical axis), I created five separate functions or GVC strands, but not necessarily exclusive to each other. This matrix can also be used in another context in the same sector.

The first function is subcontracting to other firms (first tier suppliers) within the country; what is called here GC-subcontracting (GC-subcontracting). Firms in this function do not directly export but produce cut-flowers according to the specifications of their buyers who also provide the necessary inputs and collect the produced cut-flowers using their own transport and logistic services. Firms can develop into grow, cut & pack for export or (GCP) which is a higher function that involves additional new activities of packing and exporting according to the requirements of global buyers in various end markets and

sales channels. The third function is called flower design & bouquet (FDB) which on top of the second function involves designing and bouquet making, based on specifications of buyers in various end markets and sales channels. Commercial propagations and cuttings (CPC) for both direct export or to supply to export producers is considered as the fourth function as it require advanced capital investment and skills compared to function 2 and 3. Lastly, firms in function 2 or 3 can progress into undertaking in-house breeding of new varieties or Breeding new varieties (BNV), which requires higher investment capabilities in laboratory equipment, high skills and advanced R&D and so on. Also new linkage and end-market capabilities to protect property rights, to sell its new variety, engage in deals that shape demand and supply of their varieties. However, it is important to note that these functional rankings are not strictly deterministic nor do they necessarily add on each other, for example, the distinct and complex activities required at function 3 may not be undertaken or may not be needed at function 4 and yet the latter is considered higher functions as it is often characterised by higher barriers to entry (Evers et al 2014; Gebhardt 2014).

Table 3.3. Floriculture GVC Technological Capabilities Matrix

Functions	Investment	Product and Production process		Linkages		
	Investment	Product	Production process	Logistic, finance & support services	Supply chain, horizontal relations	End market
GC-subcontracting (Grow and Cut)	Investment in basic open-air production facilities i.e. shade netting, simple irrigation and fertilisers; Selection of varieties; Increasing varieties; Expanding cultivation.	Producing according to buyer (1st tier supplier) requirements on volume, quality, delivery; Improving product quality.	Basic farm management system and data recording.	Basic access to finance; Access and manage logistics.	Source fertilisers from the suppliers Comply to production requirements of buyers (1st tier suppliers).	Negotiate price, volume and quality in contracts with 1st tier buyer(s); Manage relation with 1st tier supplier.
GCP (Grow, Cut, Package)	Selection of production location; Selection of greenhouse and other equipment; Construction of packaging & inspection house, cold storages and Accessing and managing refrigerated trucks and cool chain Invest in exclusive rights for producing certain varieties; Inventory and storage system; Recruit and train managers & workers; Improve working conditions and environment.	Meet minimum quality req. of targeted markets (e.g. Dutch auction channel, direct sales to European retailers and/or regional wholesalers; Creating product portfolio; Managing volume and varieties; Producing exclusive products.	Compliance with local social and environmental standards; Compliance with international standards (MPS-ABC; Global-gap); Improve labour productivity and monitor and control production process (cultivation, harvest post-harvest levels); Improve efficiency & quality; increase yields of products that meet specifications (stem length, head size, vase life); Flower propagation; Control and improve	Contracts with utility & service providers (electricity, water etc.); Access to and improve cool chain from farm to airport; Access to cargo booking and handling services; Dealing with investment & working capital finance; Relation with training institutes; Relations with consultants; Link to state support institutions & participation in initiatives.	Access to varieties from breeders; Access planting materials (propagation) Source inputs (packing materials; chemicals) Links to international consultants, other firms & collaborations in collective schemes; Engage in collaboration with buyers (retailers) to improve compliance to production and product standards Participation in industry association Engage in close cooperation with breeders to gain access to exclusive rights for unique flower.	Find buyer in direct sales and/or access Dutch auction; Provide information at required level of accuracy; Develop system and skills for communication with market actors (buyers/agents etc.) Build relation with auction service providers Build relation, negotiate directly with buyers. Increase market intelligence. Market promotion and branding Create new end markets and new buyers: global, regional and domestic. Building relations with new buyers; Develop multiple marketing strategies

			consistency and reliability in all product portfolio; Control and improve packaging; Improve human resource management; PEST management.			Develop marketing and sales channels to high-end niche markets Engage in close relations with florists and traders to develop market preferences.
FDB (Flower Design & Bouquet)	Expansion packaging house for bouquets; Expanding logistic facilities and channels for sourcing; Invest in providing input and support for sub-contractors; In-house training & development of workers skills for handling and designing.	Design and pack a variety of flowers; Design bouquets according to buyer's demand requirements and needs.	Produce summer flowers as 'fillers' for bouquets.	Create a system for delivering summer flower breeds to sub-contractors and collecting summer flowers in return.	Identifying and supporting sub-contractors and training of sub-contractors in handling and production of flowers.	Market products to retailers and wholesalers and build strong relationships.
CPC (Commercial propagations & cuttings)	Advanced greenhouse technology, licence from breeders; Development and training of working staff.				Create exclusive relations with breeders, joint ventures.	
BNV (Breeding new flower varieties)	Breeding facilities such as laboratory equipment and land for showcase; Property rights for breeds; Development and training of working staff.	Identify original breeds to be further developed into new breeds.	Manage advanced R&D processes for breeding; Use consultants and experts to facilitate R&D.	Attract, select and train academic workers with highly qualified skills and knowledge.	Create exclusive relation to traders and florists to target high-end market segments.	Create new sales and marketing channels to target flower farms.

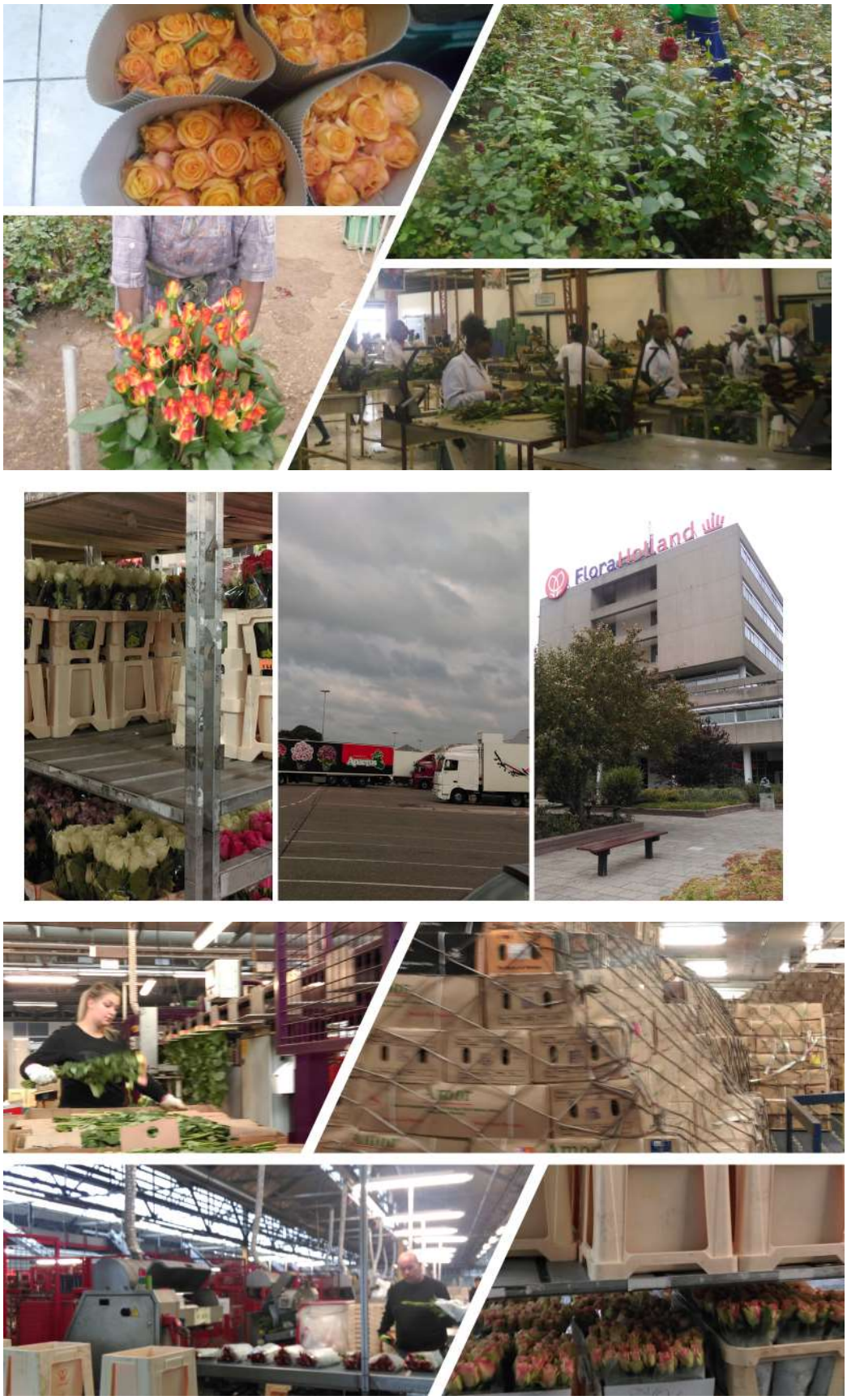
3.4. Conclusion

The chapter provided an overview of the development of the floriculture GVC and its major players. It also discussed market features, governance structures and diverse upgrading paths focusing on the most dominant floriculture GVC nodes wherein Ethiopian-owned flower firms as well as many developing countries participate. Furthermore, the chapter developed sector specific TC and upgrading matrix by identifying five functions or strands in the floriculture GVC and specified the required TCs to participate in each of those floriculture GVC strands.

Over the past few decades, the global flower trade was transformed from a regional market into a sophisticated demand-driven global market organised in global value chains. Although production increasingly moved to developing countries with competitive advantages in agroecological conditions and cheaper labour, consumption remains concentrated in European, North American, and Japanese end markets, even though demand is growing in new end markets in the global South. Europe, especially the Dutch auction, remains the most important sales channel for Sub-Saharan African countries such as Ethiopia and Kenya. However, the importance of the direct sales channel is increasing in both traditional as well as emerging markets, particularly in the Middle East.

The chapter explained governance structures in floriculture GVC of traditional and emerging end markets; identified factors that shape the governance originating from various institutions and chain actors. In doing so, the chapter uncovered the implications for which TCs are required for Ethiopian firms to enter, remain and capture value in the floriculture GVC. It also indicated the upgrading potential in various strands of the GVC. The existing floriculture GVC literature described the auction governance as market-based, characterised by loose relationships, which implied limited learning and upgrading potential for supplier firms in the auction GVC. However, the literature considered only the auction's institutional rules or minimum requirements, ignoring (at least implicitly) the role played by unpackers in the auction channel, which is vital in analysing the chain, especially when the focus is on locally owned firms in developing countries. Based on the empirical evidence, the chapter showed presence of various governance structures at different nodes of the auction channel but the characteristics of relations at specific nodes may not be captured by a single governance type.

Furthermore, the chapter showed that upgrading in the floriculture GVC is not a linear process but much more diverse than generally conceptualised. The varying governance structures in the floriculture GVC involving both stringent and less demanding end markets and sales channels, offer broader choice for supplier firms. Hence, it makes sense to expect that Ethiopian supplier firms could follow different export trajectories seeking to secure profits and minimise risks. This will be seen in the fifth chapter, where the TCs of Ethiopian-owned firms are measured and their performance is explained; but before that it is important to examine in more detail the context, rise and evolution of the Ethiopian sector, as it also influences the choices and strategies of the firms, to which the next chapter now turns.



Source of images: author

4. Development of the Ethiopian Floriculture Export Industry

4.1. Introduction

Ethiopia is one of the more recent suppliers in the global industry of floriculture, but it has rapidly positioned itself among the top five exporters in the world. The objective of this chapter is to describe the emergence and development of the export sector in Ethiopia and identify major factors that drove its development.

The first part of the chapter presents the evolution of the sector in phases. The origin of the Ethiopian industry can be traced back to two state-owned firms that evolved starting from Haile Selassie's regime (1930-1974). But, the industry in its current form, led by private firms, began in the 1990s as a result of the initial experiments of two local entrepreneurs who pioneered the private-owned flower export business. Despite their limited success, the pioneers' experience significantly influenced the content of the industrial policy implemented by the government in subsequent years. Because of the generous incentives in the government's industrial policy, a large number of local and foreign firms invested in the industry, reaching the critical mass needed to utilise collective efficiency around 2004-2005. In 2015 the total cultivated land reached 1,623 hectares, and 66 firms exported 50.4 million kilograms of flowers and generated US$ 225 million foreign exchange. Nevertheless, the growth of the sector slowed down after 2008 and several local and foreign firms collapsed.

The second section of the chapter specifically identifies and discusses the key factors that shape the development of the sector. The industrial policy, the industry association and the Dutch development program are identified as the major factors behind the emergence and development of the Ethiopian floriculture industry. The industrial policy tackled some of the major infrastructural and institutional failures and provided non-discriminative incentives (financial and non-financial). As a result, it attracted large numbers of investors as it lowered barriers to entry for both local and foreign firms. It also indirectly encouraged learning through playing a supportive role, especially in earlier phases and working in partnership with the industry association and the Dutch development program. The industry association (EHPEA), served as focal point for partnerships and coordinator of activities undertaken by various actors (state and non-state) that support or influence the industry. In doing so, it significantly contributed to the development of sector-specific systems of innovation. Similarly, the Dutch development program remained a crucial partner for over a decade and provided a distinct support, driven not only by conventional development cooperation but also by the economic motives of the Dutch in relation to the global floriculture industry. Accordingly, the support provided the necessary knowledge and experience in the systems of innovation. The section further discusses that the three factors separately and more importantly, in collaboration, drove rapid development of the sector. But, the industrial policy which had stronger potential to influence the role of the other two key factors, failed

to adequately play its role. The last section of this chapter concludes the chapter by reiterating the key points.

4.2. Evolution of the export sector in phases

As shown in Figure 4.1, the evolution of the sector is roughly divided into five phases: initial experiment, early movers, take-off, maturity and consolidation/stagnation. This section of the chapter discusses these phases. In the first phase, alongside the operation of the two public farms, which were predominantly growing vegetables and fruits, entrepreneurs began the initial experiments of export production of summer flowers and then roses under private ownership, using the support of international donors to access the necessary resources. This period, particularly the second phase, also saw some changes in macroeconomic and trade policies of the country, which attracted the first FDI to the sector that started growing roses using more advanced greenhouse technologies. But, market and institutional failures were still prevalent. In these two phases, Europe was the main destination of the Ethiopian flowers, with Germany being the dominant market.

The sector experience significantly leaped in its development during the third phase, following the implementation of a targeted industrial policy, which provided enormous incentives and support to the sector which in turn attracted large numbers of local and foreign firms into the sector. Sector-specific knowledge and institutions began to form and actively operate in the second and subsequent phases, enjoying substantial national and international (especially the Dutch) support. However, the number of local firms started declining fast as the sector began maturing roughly after 2007; while simultaneously foreign firms had grown and started dominating the sector. During the last phase, in which the sector appeared consolidated, it was showing a stable albeit small rate of growth with clearly defined institutions and linkages, yet, it also appeared stagnant with limited expansion of cultivation and a declining number of new entrants as well as poorer coordinated support.

Figure 4.1. Evolution of flower sector and Ethiopian-owned firms

Source: author's construction based on primary and secondary research of the thesis

4.2.1. Early development of the sector: State-led foundation and private-led experiments

During Haile Selassie regime the country launched its first concrete industrial policy with ambition to transform the economy. The so-called five-year development plans[25] envisaged to run for 20 years starting from 1956 with some technical and financial support of the World Bank, USAID, FAO and other NGOs (Rahmato 2009). Under this plan the regime achieved considerable success with import substitution industrialisation[26] (textile, leather cement, tobacco, sugar factories) and large-scale agriculture (sugarcane, cotton, coffee, horticulture) with participation of both public and private firms; but the latter was dominated by foreigners partly due to lack of national investment capital (Ibid, Chole 2004). One of the challenges that constrained any meaningful achievement, especially in agriculture, was the land policy, which has been shaping the socio-economic and political situation of the country ever since.[27] Under the last imperial (Solomonic dynasty) regime, where the emperor had absolute power, a complex tenure system was practiced (a mix of communal land and tenancy), which deprived land from the majority (peasants) and created a small landed class (nobles, warlords). Whatever efforts were made to develop agriculture, it barely changed the lives of the peasants or the majority. The

[25] Manufacturing was already taking place since 1920s. According to Afro Consult and Trading Plc 2002 cited in Gebreeyesus (2013) in 1927, there were around 25 factories operating in the country that included wood, clay, tanneries, soap, edible oil, ammunition, brewery, tobacco, cement, and grain milling. This effort was disrupted by Italian invention in 1935 and the WWII.
[26] In the period 1954-1970, import of consumer goods fall from 73% to 30% of the total domestic supply (Faruqi and O'brien 1974,26 cited in Chole 2004:49).
[27] For detail on land tenure and agrarian development of Ethiopia, see studies by Dessalegn Rahmato (1984, 2008).

prevalent landlordism and their resistance to change the land policy (tenure system) resulted in stagnated productivity and growing resentment in the peasantry (Rahmato 1984; 2009).

Eventually, the monarchy was shaken to its core by the revolution of its own elite (educated youth mostly the children of the aristocrats, the nobles) who were under strong influence of foreign leftist ideologies. They led the so-called *'ye temariwoch ametse*' (students' protest) under the slogan of '*meret larashu'* (land to the tiller). This revolution was hijacked by the military committee commonly known as *derg* that overthrew the emperor (Rahmato 1983; Zewde 2001). The *derg* regime (1974-1991)[28] had a pivotal impact on Ethiopian history by dismantling the monarchy and, in its own way, it tried to implement the slogan of 'land to the tiller'. It nationalised all land and provided usufruct rights to peasants but controlled their production and marketing decisions via a cooperative system to feed into its centrally planned economy, informed by the communist (Marxism-Leninism) ideology. The *derg* regime attempted to continue and expand the import substitution and large-scale agriculture activities but unlike Haile Selassie's regime, *derg's* development plan was almost entirely state controlled. The regime established several agriculture enterprises, and expanded enterprises from the imperial time, including Upper Awash Agro-Industry Enterprise and Horticulture Development Enterprise, which were the two public farms where flower production for the export market began.

Upper Awash Agro-Industry Enterprise and Horticulture Development Enterprise operated in a number of locations across the country and had their own marketing and distribution centres. While Upper Awash Agro-Industry Enterprise largely produced fruits, the Horticulture Development Enterprise (which had farms located in Ziway, Gibe, Dire Dawa and Holeta) produced vegetables, summer flowers and conducted experiments on growing roses. The public firms had their own marketing and distribution centre called Etfruit that exported mainly to the Netherlands, Djibouti and the Middle East (World Bank 2004)[29]. Etfruit also handled the transportation and logistics from farm to the airport for all the public, as well as for relatively large-scale private farms using its refrigerated trucks and warehouses in various locations. Moreover, Etfruit had distribution outlets in most of the large towns in Ethiopia; in Addis Ababa alone, it had 21 retail stores and over 30 mobile stands selling fruits and vegetables (US embassy 1999[30]). Although growing flowers were short-lived endeavours in those public firms, their experience had spillover effects through demonstration and linkages with pioneers like Ethio-flora PLC. The knowledge and the market network contributed (usually indirectly) to the development of the modern floriculture sector in the country.

[28] The *Derg* regime ruled Ethiopia from 1974 until 1991. During this period, it almost wiped out the country's educated youth and technocrats and radically dismantled the traditional social hierarchies.
[29] Under the *derg* regime, both firms and Etfruit (the marketing and distribution centre) were state-owned. For some time, all the three firms remained under public ownership under the incumbent government, but the land HDE held was leased for floriculture and wine yard in Ziway by Sher Ethiopia and Castel Winery respectively. UAAIE was also privatised and sold to MIDROC, the diversified business group owned by Mohammed Hussein Ali *Al-'Amoudi*. Etfruit is still operating on a smaller scale but as a public share company.
[30] Commercial report: Fruits and vegetables export is growing. US Embassy Addis Ababa, Commercial section December 7 1999: http://www.oocities.org/~dagmawi/NewsMar2000/Business_Horticulture.html last accessed in January 2017.

Nevertheless, the contemporary floriculture industry of Ethiopia was built more directly upon the experiences of two locally owned private firms, Meskel Flower PLC and Ethio-flora PLC. Following the political transition of 1991, in which the Ethiopian peoples' republic democratic front (EPRDF[31]) led by Tigray people's liberation front (TPLF) came to power, the macroeconomic conditions of Ethiopia changed significantly. The long closed and centrally planned economy was partly liberalised and opened up for private investment, which inspired some diaspora and indigenous entrepreneurs to invest in their country.

Meskel Flower PLC and Ethio-flora PLC were established near Lake Ziway, 160km south of Addis Ababa. Meskel Flower PLC, founded in 1992 by an Ethiopian diaspora from the US, began production of summer flowers, but later shifted to establish the first rose farm in 1999. The second pioneer firm, Ethio-flora PLC, was founded by an indigenous entrepreneur from a business family who was inspired by the state-owned farms. He launched a horticulture farm in 1993 growing vegetables and soon diversified into summer flowers. In the absence of appropriate infrastructure for flower export production and any government support, the two firms separately went through steep learning periods and mobilised support through their own networks, shaped by their individual backgrounds.

The owner of Meskel Flower (Eskinder Yoseph) was a diaspora investor: a former pilot and a banker who was educated and lived in the USA and had a dream of setting up his own business in Ethiopia. He came across Kenya's floriculture sector success story during his search for investment opportunities, which was a convincing factor to set up Meskel Flower PLC in 1992[32]. The farm was established near Lake Ziway, 160km south of Addis Ababa at an altitude of around 1650 meters above sea level. He made a considerable pre-investment search effort including visiting commercial farms in the USA and the Netherlands, looking for international support and studying a detailed soil map of Ethiopia in order to find the appropriate location in terms of climate, soil and water (UNCTAD 2002). The owner did manage to secure financial and technical support from the World Bank, FMO (Dutch development finance) and other international organisations, hence able to bridge the necessary financial and knowledge gap. Apart from the capital investment, the pioneer hired a Kenyan consultant for two years, which enabled him to train the workforce. In 1993, Meskel Flower made its first export of open field summer flowers to the Dutch market. However, after five months, the tough competition pushed out the firm from the Dutch market. As a result, the owner was pressed to learn more about the market side of the business and eventually found out the potential of Germany's market for higher value products such as roses.

[31] EPRDF is a coalition comprising four ethnic-based regional parties: Tigray's people liberation front, Amhara national democratic movement, Oromo people's democratic organisation and Sothern Ethiopian people's democratic movement.

[32] Interview with the owner of Meskel Flower PLC is conducted in 2007 and it was not possible to reach him during the fieldwork of this thesis. Parts of 2007's fieldwork was published: Melese and Helmsing (2010).

The firm made additional investments to upgrade greenhouses, drip irrigation, cold storages and so on. In 1999 the firm launched the first successful rose export of the country, which was destined for the German market. In the meantime, the owner continued his effort to show the export potential of the flower sector to achieve the aim set out in government's policy papers. In this regard, he wrote an article for a locally influential economic bulletin of that time, arguing for Ethiopia's competitive advantage in the global cut-flower industry[33]. By drawing on his experience in running the first rose farm in the country, he listed out policy and other measures needed to realise this potential, starting from incentive structures to setting up a business association.

Despite the substantial challenges it faced, due to lack of appropriate physical infrastructure and institutional support, in 2000/1 Meskel Flower's rose export reached 5.5 million stems and employed 500 people[34] (ITC website). An UNCTAD report on investment and innovation policy in Ethiopia identified Meskel Flower PLC as a successful flower exporting firm that could have an important demonstration effect in attracting foreign direct investment and local investors to the sector, given that the necessary institutional support and appropriate physical infrastructure that were missing at that time could be provided. Unfortunately, Meskel Flower PLC ceased operations in 2001 due to the arrest of the owner.[35]

The second pioneer firm, Ethio-flora PLC was founded around the same time as Meskel Flower PLC. Ethio-flora was set up by an indigenous entrepreneur who was agriculturalist by training and came from an entrepreneurial family that had been operating in livestock and dairy businesses. The owner gained more information about the sector from his college friends who were then working at the public farms, which helped him to prepare a feasibility study for his Ethio-flora PLC. It was founded nearby one of the public farms and produced summer flower (statice and allium) on a small scale alongside its main products, vegetables and fruits, which were produced for domestic markets and exported to neighbouring countries such as Djibouti; while the summer flowers were exported to the European market. The firm faced the same infrastructural and service problems as Meskel Flower PLC did and the owner explained that the public firms were the only meaningful source of knowledge, "…we have learned many things from the public farm in Ziway and sometimes by poaching their workers". Although the other pioneer firm (Meskel Flower) was operating in close proximity, there was no interaction between them and the two pioneer firms didn't know each other until a later stage. In 1996, Ethio-flora was able to expand its cultivation of summer flowers into more than a hectare, as it gained support (financial, technical and marketing) from international organisations to cultivate carnations as pilot

[33] Bulletin of the Ethiopian Economic Association called Economic Focus, Vol 2. No. 2 April 1999.
[34] http://www.tradeforum.org/Meskel-Flowers-Ethiopia-exporting-cut-flowers-against-competition/ last accessed on September 12, 2017
[35] The owner of Meskel Flower was jailed in 2001-2 on an alleged corruption charge, which likely was politically motivated.

project. But due to high competition in the international market, particularly from Kenya, it was forced to cut down its flower production and focus more on vegetables and fruits.

Although the firm has not succeeded expanding the flower production, working with international donors' organisations created access to different sources of knowledge and relevant networks outside the country, which in turn helped the owner to establish a rose farm later in 2004. In this regard, through the support of donors, the owner visited European markets (and met important market players) and other production locations like Kenya (met producers, experts, input suppliers) and gained a better understanding of the international market and production techniques.

The firm continued putting technological efforts in place to expand its non-flower horticulture export production and the result was significantly shaped by the presence of the publicly owned farms, particularly by Etfruit, the marketing and distribution subsidiary of the public farms. Ethio-flora minimised the prevailing infrastructural and logistical constraints it faced and expanded its export to European markets by linking up with Etfruit which had relatively better transportation facilities (including refrigerated trucks and chartered flights), export experience and connections to international markets. Moreover, thanks to this linkage with Etfruit, the firm could improve its consistency in market presence despite its limited financial capacity to export continuously.

As the owner told the US embassy newsletter (in 1999), the firm was exporting without interruption due to the support of Etfruit that made the required advance payment for freight costs, which would have been difficult for the firm to meet such financial obligations as freight cost then could reach up to 80% of the total costs[36]. The firm further reduced its production, administrative and market related barriers using the support of Etfruit in handling all paperwork related to customs and phytosanitary clearances, which enabled the firm to focus on its main activities. However, the share of Ethio-flora's flower production continuously declined, until around 2002/3 when it fully stopped growing flowers and it started concentrating on other horticulture export production. This was mainly due to facing stiff competition in the European market from experienced Kenyan and Dutch firms, which is similar to the story of Meskel Flower PLC that switched from summer flowers to roses due to competition.

Ethio-flora's network and experience were further strengthened from 2002 onwards, as the owner, together with other fruit & vegetable and flower exporters (both public and private), founded the sector association (EHPEA). The owner of Ethio-flora used his political connections to engage with the late prime minister, which enabled him to successfully lobby for support. He remained a founding chairperson of the association for ten years and played a critical role in promoting the sector. In the

[36] Beside the time constraints for conducting long interviews, some of the earlier stories are far from the memories of the owner so when possible, secondary sources were used to supplement the firm history narrative. For instance, the link below shows the commercial report produced by US embassy in Addis Ababa on December 1999. It is retrieved from the following online link: http://www.oocities.org/~dagmawi/NewsMar2000/Business_Horticulture.html and last time checked was October 19 2017.

words of a local flower firm owner: “he is strong lobbyist, sharp business man - he is the godfather of the sector but he also makes sure that he benefits the most out of it”.

Beside the formation of the association, as of 2002 the sector got increasing attention at national as well as international levels and as a chairperson of the association, the owner of Ethio-flora was a focal point for all actors, which helped him further enrich his network in both spheres and he remained a ‘must contact’ person for sector related issues even after he left the chairperson position in 2012.

Despite their limited success in expanding their flower export production, the effort of the two pioneer firms had a demonstration effect. For instance, their experience informed the decision of Golden Rose Agro PLC to enter the sector in 1999. It was the first foreign direct investment in the industry and it was founded near a small town called Tefki, around 38km south west of Addis Ababa at the altitude of 2060 meters above sea level. The entry of the first FDI was partly incentivised by government policies such as export promotion strategy and privatisation of publicly owned firms, which both were launched in 1998.

Aiming to diversify export sectors and increase foreign exchange earnings, the former policy provided certain incentives such as removing import tariffs and restrictions and reduced tax or tax exemption on exports. Although Golden Rose had no prior experience in floriculture, it had higher investment capabilities and willingness to take risks[37]. It became the first firm to adopt modern technology in the Ethiopian floriculture sector such as a steel-based green house. It also demonstrated the potential of the country to grow high quality roses (Gebreeyesus and Iizuka 2012). Furthermore, the firm hired Israeli consultants and Indian farm managers to set up the greenhouse, train workers and run the operation.

In 2000, the firm made its first export to the Dutch auction but it lasted only four months, since it found the price too low as compared to the auction related costs. So, Golden Rose switched to direct sales to Germany and United Emirates, thanks to the mother company in UK which quickly found buyers in the new markets where the firm successfully exported to until its collapse in 2012. Golden Rose was an important input provider for early entrants, as it established its own packaging factory and imported chemical and fertilisers in bulk.

The policy improvements and success of Golden Rose attracted investments by three locally owned firms (Enyi, SIET-Agro and Summit) and one joint venture firm (Ethio-Dream). According to the World Bank (2004) there were only four exporting firms (all except SIET-Agro) at the beginning of 2004.

[37] According to Gebreeyesus and Iizuka (2012), Golden Rose was a subsidiary of RINA investment based in UK (Indian-British family), which had broader investment experience in African countries before its arrival to Ethiopia. Although its initial entry to Ethiopia was for another business bid, the failure of its original plan led to exploration of other opportunities in the country. The firm was convinced by its consultant to invest in rose production. The experience of the two Ethiopian pioneers provided input for the feasibility study of the firm. Golden Rose is no longer operating in the industry, but it made a huge investment in learning that benefited later firms.

However, there were five more flower firms (Ethio-Rose, Holeta Rose, Garad PLC, Menagesha PLC and Blue Nile Flora) registered as members of EHPEA alongside 11 non-flower growers.

4.2.2. From take-off to maturity and consolidation

As shown in Table 4.2, the numbers of new entrants to the sector continuously increased concentrating within a radius of 200km from Addis Ababa with a few exceptions such as Bahir Dar. The clusters are often named after the closest town in the area like Ziway, Debre-zeyt, Holeta, Koka, Sebeta, and Sundafa which are the major clusters (See Figure 4.2 below). They are located at ranges of altitudes between 1,500 and 2550 meters above sea level, growing various types of cut-flowers, especially roses. Based on average altitude and soil type, the clusters can be classified as lowland, intermediate and highland cultivation areas. While Ziway and Koka can be considered as lowland and more suitable to grow small head or sweetheart roses, Sebeta, Holeta and Sendafa can be considered as highland, best for growing large head size and long stem roses. Debre-zeyt (Bishoftu) and Bahir Dar fall between the two extremes and offering suitable ground to grow medium size and tea-hybrid roses.

Table 4.1 Growth of Ethiopian flower industry

Year	No. of growers	Cultivated land (ha)	Export value in millions (USD)	Employment
2003/4	9		5	
2004/5	30	150	13	21,300
2005/06		345	23	
2006/07	86	802	64	
2007/8		922	112	25,816
2008/9		1,240	131	34,720
2009/10		1,306	170	36,568
2010/11		1,300	175	36,400
2011/12	80	1,299	198	40,387
2012/13			187	
2013/14	84	1,426	200	
2014/15	87	1,623	225	≈40,575[38]

Source: Compiled by the author based on data from the National Bank of Ethiopia, Development Bank of Ethiopia, Ethiopian customs authority, Ethiopian horticulture development agency, Ethiopian horticulture producer and exporter association, Oqubay (2015) and Gebreeyesus and Iizuka (2012).

Figure 4.2. Distribution of major Ethiopian flower clusters

[38] Number of workers for 2014/15 is based on interviewed experts' estimation for the local industry to hire 25 persons per hectare on average.

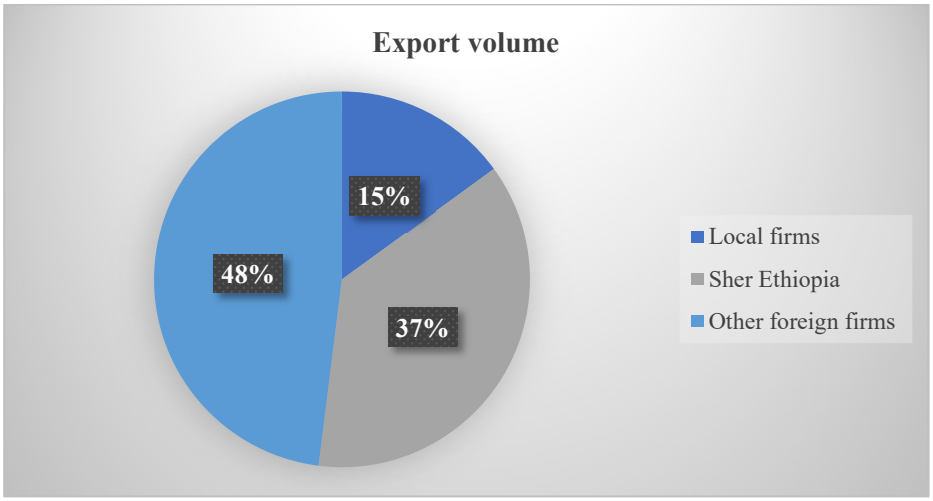
Source: Produced by the author using google map.

Around 2003, the embassy of the Netherlands in Addis Ababa organised several trade missions that led to large inflows of Dutch foreign direct investment into the industry, making Dutch-owned flower firms the dominant players in the Ethiopian floriculture sector. The arrival of the Dutch and others (mainly from Israel and India) resulted in the phenomenal growth of the sector. Within three years (2004/5-2006/7) the cultivated area grew more than fivefold (from 150 to 801.6 hectares) and 70 flower farms were operational, while six more were in the process of setting up their business (Melese and Helmsing 2010). At the same time, the Dutch auction opened an import office in Ethiopia and expanded its client base quickly, after which the auction became the major market channel for Ethiopian flowers and by 2006 it was selling 67% of exported flowers.

The entry of Sher Ethiopia in 2005 was particularly important. Sher Ethiopia is part of Afriflora, founded and run by the Barnhoorn family (a Dutch family). It is one of the biggest rose producers in the world, operating globally in different parts of the value chain. Until 2007, the company had been operating in Kenya for 15 years, cultivating 300 hectares of land. It entered the Ethiopian sector in 2006 with around 500 hectares of land in Ziway. Sher's move was partly to capitalise on the trade preference that Ethiopia is entitled to, due to its least developed position, which was more conducive than Kenya's (Keane 2013), but also a result of attractive negotiations with the Ethiopian government. As Figure 4.3 shows, in 2015 more than a third of Ethiopia's total export (37%) came from Sher but the firm played an important role in expanding the industry in Ethiopia since its entry, through its unique business model: building a 'turn-key' - a project with all the infrastructure in place and selling it on a hire-purchase basis. Investors can rent 'ready to operate' greenhouses with an opportunity to become owners within 8-9 years. This model lowered the entry barriers in the sector and attracted four local investors (including Meskel Flower - the

pioneer[39]) and five Dutch investors into the industry. In 2015 Sher Ethiopia secured loan from IFC (International Finance Corporation) and as of 2017, its cultivated land reached more than 650ha land in three locations (Ziway, Koka and Adami Tulu).[40]

Figure 4.3. Export share of local firms, Sher Ethiopia and other foreign firms in 2015



Source: author's calculation based on EHDA's data

Moreover, initially Sher Ethiopia participated in multiple parts of the global chain, which facilitated the further development of the sector, while enjoying first mover advantage on some services. For example, Sher imported and distributed inputs (through Agri-Sher plc) that are needed by the industry and provided transportation (this included cold truck ground transport to Bole airport and from Liege airport, where the Ethiopian Airline cargo lands, to the auction in Aalsmeer or elsewhere as needed) and handling or freight forwarding services (booking cargo spaces in Ethiopia, handling palletising packed flower boxes before loading on a plane) via its sister company Flower Port Plc.

Before the arrival of Sher, logistics and input related constraints were tackled through joint actions of members of the association (most of them local firms) whom, with the support of government, founded a service provider company and cooperative that undertook joint imports of inputs and air cargo bookings. However, the latter service is no longer provided, as it is now monopolised by Ethiopian Airlines[41].

Since 2008 however, the boom of the sector slowed down. As indicated in Table 4.3, in 2006/7 the total number of flower firms was at its peak (86), but the following years have seen a considerable drop and volatility. Especially the number of local firms sharply decreased from 38 in 2006/7 to 15 (excluding

[39] Meskel Flower collapsed in 2001 following the arrest of the owner but upon his release in 2005 the owner established a new farm with the same name under the 'turnkey' of Sher Ethiopia.
[40] The website of Afriflora provided: https://afriflora.nl/en/about-us/
[41] Some episode of fight for monopoly, breaking monopoly and then price war occurred before the action of the Ethiopian Airlines (see Taylor 2011).

one joint venture) in June 2016. Whereas, the number of foreign firms increased from 26 to 66 in the same period. According to the authors inventory, since the beginning of the sector, over 19 local firms have collapsed. The major reason might be related to performance but there were a few firms that broke down because of natural disaster (flood) or forced eviction for rail road construction. They never returned to the business. But it is important to note that several foreign firms, including Dutch and Israeli, did collapse as well.

Table 4.2: Number of flower firms by ownership[42]

Ownership	Number of flower farms					
	2005/6	2006/7	2008	2012	2013	June 2016
Ethiopian	21	38	23	19	12	15
Joint	8	9	15	7	12	1
Foreign	13	26	26	43	30	66
Unknown	7	13	3		8	
Total	49	86	67	69	62	82

Source: Melese and Helmsing (2010); Gebreeyesus and Iizuka (2012); Oqubay (2015); EHPEA website[43], fieldwork.

During preliminary research in 2016, ahead of the local firm survey, I confirmed that there was a total of 82 flower firms operational in the country, of which 61 were rose growing firms, 15 summer flowers and the remaining 6 producing cuttings. Some of these firms produce other horticulture products (fruits, vegetables and herbs) for export, in addition to flowers. According to EHDA, in 2015 the total cultivated land reached 1,623 hectares, and 66 firms exported 50.4 million kilograms of flowers and generated US$ 225 million foreign exchange. This shows that despite the continued growth, the rate has dramatically declined between 2008/9 and 2014/15. The total cultivation land grew only by 31 percent.

On top of that, the political protests that began in 2015 had negative effect on the sector, due to protesters attacking a number of flower firms, resulting in significant damages ranging from disruption of export for a few days to a complete collapse of a few firms. This in turn affected the export performance of the sector, not to mention investors' fatigue and negative impacts on related service industries such as Ethiopian Airlines. Nevertheless, this situation seemed to stimulate the government to recalibrate, as it

[42] The number of farms can be over or understated, and proper identification of ownership is a difficult task, as the available database from EHDA does not seem to be updated when changes occur in ownership. Moreover, sometimes a single firm might be reported with different names, such as by the owner's name as well as by the firm's name. Although considerable effort has been made to solve this problem through triangulation of different sources, one should not be surprised to find reports with slightly different total number of firms and ownership structures. Apart from that, when firms collapse, it is often only the ownership that changes, not the name of the firm which makes the task of sorting by ownership more difficult.

[43] http://www.ehpea.org accessed December 2016

began to promote a new 'horticulture hub' away from the Oromia region[44] where most of the flower clusters are still concentrated to date. In 2017 EHPEA, together with the government, began promoting three new (Arbaminch, Hawassa and Alagae) and one (Bahir Dar) existing horticulture hub.

4.3. Factors driving the development of the Ethiopian floriculture sector

In the development of the Ethiopian floriculture industry, state, private sector and international institutions played a pivotal role. This section discusses the three major drivers: industrial policy, industry association and Dutch development program. These have played an important role separately, but more importantly in collaboration through public-private partnership programs coordinated by EHPEA (industry association).

The association played a leading role in addressing collective problems, improving the standard of the sector and promoting it in the global arena. It was also instrumental by serving as focal point for integrating sector specific efforts and it coordinated the development sector specific national innovation systems. With regard to the latter, the role of the Dutch development program - the third key driver, has been crucial, since it came with rich knowledge about horticulture/floriculture and it was driven not just by a conventional development goal but also by (Dutch) economic motive that aligned with the Dutch auction[45].

The state has been an active player in multiple ways in terms of creating an 'enabling environment' but also actively promoting the sector through a targeted industrial policy. As a result, it incentivised large number of local and foreign firms to invest in the sector and supported the expansion of sector specific knowledge in the country. However, as the performance report of the Development Bank of Ethiopia (DBE) shows, the incentives were poorly managed, and the government failed to keep its initial enthusiasm to support the development and functioning of the innovation systems. Although the industrial policy successfully attracted several experienced FDI, it played limited role in inducing FDI spillover.

4.3.1. *Macroeconomic environment and industrial policy*

The rapid growth of the Ethiopian flower export sector is largely due to a sector specific industrial policy that was launched in 2002. Since 1990s, the EPRDF government adopted 'Agriculture Development Led Industrialization' (ADLI) as its overarching policy framework, under which it set industrial goals

[44] Oromia region was the centre of political protest since 2014 and the issue of land right and peasant eviction under the pretext of 'Addis Ababa Master Plan' was among the core reasons for the protest.
[45] The triple role of the Dutch (development support, as foreign investor (FDI), Dutch auction as major sales channel) and its potential impact in 'endogenization' of the Ethiopian flower export sector is documented in the author's earlier joint work Melese and Helmsing (2010).

(Industrial Development Strategy) that included an export promotion strategy in which potential or priority sectors were identified and promoted through special incentives.

However, floriculture was initially not among the selected sectors, but was later included as the industry association lobbied for its selection. After that, the chairperson participated in designing the action plan for floriculture. Moreover, according to the owner of Golden Rose (the first FDI), following a request from the chief economic advisor of the prime minster, he was engaged as a government consultant to assist with the writing the five-year promotion plan of the sector. Consequently, since 2003 several investment incentives were provided to the sector.

At the end of PASDEP period (2005/6-2009/10), based on a policy paper that concretely identified sector specific support, the government planned to put 2000 hectares of land into flower export production and generate jobs for 70,000 people. Several government units were established, directives and regulations were issued, intending to facilitate, support as well as regulate the sector. In 2003 the Ethiopian export promotion agency, and from 2004 until 2008 also the national export coordinating committee, provided substantial support by closely working with EHPEA to tackle infrastructural as well as bureaucratic problems in implementing the industrial policy. In 2008, a lead agency, Ethiopian Horticulture Development Agency [EHDA], was set up to continue facilitating and supporting sustainable development of the sector.

The government made land available in water-abundant areas within close proximity to Bole international airport for long-term lease at a very low price, around $10/square meter/year, compared to $30-40 in Kenya (Oqubay 2015). It also provided generous investment incentives, including income tax holiday for five years, loss rescheduling provision and removal of tariffs and duties on capital goods, spare-parts and inputs. A less discussed role that was also played by the government included easing regulations on the import of pesticides and fertilisers (Taylor 2011). More importantly, the Development Bank of Ethiopia (DBE), a state-owned bank, provided soft loans, which financed 70 percent of the cost of the project only pledging the project itself as collateral, at a very low interest rate compared to the neighbour countries such as Kenya, Tanzania and Uganda (Taylor 2011). These incentives led to an influx of both local and foreign investors in the sector.

Although it was reported that the Bank initially tended to favour foreigners over local firms (Taylor 2011); a significant number of local firms accessed the soft loan. As the data collected from the Bank shows, since inception of the industry until 2013, DBE financed 50 projects/firms with an amount of 1.5 billion ETB. Most of the loan went to foreign firms who also constituted the larger share of defaulted loans. Thirteen projects/firms that received around 15 percent of the total approved loan have settled their loan, which includes four locally owned, six foreign, two joint venture and one with unconfirmed ownership.

In 2013, 36 projects had an outstanding loan at DBE and half of them were foreign owned, while 15 were from locals and the remaining three were joint ventures. In the same period, 31 percent of the total loan was under the rehabilitation unit due to bad performance. The Bank admitted to not having proper systems to monitor credit performance, such as a database on dispersed and collected loans. Yet, it claimed that over 50 percent of the approved loan had been collected. In its most recent performance report (August 2017), the Bank reported to have lent for 24 flower projects (only four locally owned) with a total outstanding balance of 471 million ETB, of which 19 percent and 14 percent were classified respectively as non-performing and loss loans. Most of the local firms that participated in the survey settled their loan and only two firms still had outstanding balances but with good performance.

During interviews two members of management explained that the Bank has been facing overall organisational and managerial problems. On top of that, it lacked sector specific knowledge. Although the latter challenge was minimised as the Bank gained experience in the sector, several problems continued to constrain the overall performance of the Bank, which eventually forced the government to replace the management which was widely viewed as corrupt and colluding with politicians[46]. In 2016, a new technocrat president was assigned to the Bank, aiming to restructure the Bank with new management.[47] Regarding the loan dispersed to the floriculture sector, the collection has improved since 2013 following the advice of the National Bank of Ethiopia (NBE), which requires the borrowers to conduct their export transactions via export facilities of the DBE until they fully settle their loans. Through this, the Bank could settle the outstanding loan by deducting from the export income.

Apart from the financial incentives, the government took some measures to resolve problems related to logistics, transport as well as input, specifically packaging materials. Aiming to retain foreign currency, the government banned foreign air cargo operators in the country as of 2007. This for some time created recurrent freight associated challenges as the state-owned carrier, Ethiopian Airlines (EAL), had limited capacity in cargo operation, despite its accredited service in passenger transport. Starting from 2009 however, EAL's capacity in freight and in lifting perishables has continuously been expanded with substantial subsidy from the government (Oqubay 2015). Consequently, from 2012 onwards, EAL further integrated the supply chain and monopolised cargo handling services, which were previously dealt with by groups of flower exporters who jointly set up handling companies. Although exporters seem to appreciate the improved services, some (especially foreign firms) were unhappy with the monopoly of EAL. Local firms have complained about the move of EAL cutting intermediaries without

[46] The performance of DBE loan granted to a certain group of investors for commercial farming in Gambella region is one of the few instances that leaked to media which, to a certain extent, verified some of the long-standing rumours about the DBE channelling the country's resources to a few political groups: https://addisfortune.net/articles/results-from-gambella-commercial-farms-disappointing/ Addis Fortune, last accessed in January 2017.

[47] Local newsletters such as Addis fortune and The Reporter wrote numbers of articles on the recent malfunctions and the new measures taken to improve the bank. Some of the news articles can be found here: https://addisfortune.net/articles/pm-appoints-getahun-nana-to-lead-devt-bank-2/ ; http://www.thereporterethiopia.com/article/dbe-overhaul-its-lending-policy

enough consultation with firms in the sector, particularly groups of firms that used to run the handling services. Nonetheless, the local firms also see opportunities in ever-expanding flight routes of EAL as it opens potential export destinations for their products.

The government also intervened to increase the availability and quality of locally produced packaging materials (under state-owned and private enterprises) to address sector specific challenges, to save foreign exchange as well as to increase the backward linkages of the industry (Oqubay 2015). The sector required a large amount of imported inputs, including packaging materials. But since locally produced packaging materials are more expensive and of inferior quality, most local firms prefer to import rather than buy locally. However, their importing capacity has been increasingly curtailed, since the government frequently changed importing rules against their business, which affected their production process and caused capital to be tied-up. For instance, exporters were entitled to import using a Cash against Document (CAD) method but the past few years the exporters were required to block 100 percent value of their import on top of CAD. In addition, the state tried to regulate foreign exchange repatriation through directives of the National Bank of Ethiopia[48]. The National Bank claimed that flower firms reported lower prices than the actual so that they could repatriate much less foreign exchange. Studies also confirmed this claim to be true, as many farms admitted reporting less than one third of their true sales price (Taylor 2011). As a result, the National Bank revised its directive a couple of times to fix repatriation rates (Melese and Helmsing 2010; Oqubay 2015) and the rate in 2017 was fixed at USD3.864 per kilogram for all exporters. Some firms complained about this blanket system as it fails to account for variation in flower types, which affect weight as well as price.

To a large extent, the government has succeeded in bringing the sector into bloom, but it lacked capability to sustain the growth by upgrading its support in a fashion that fits the evolving demand of the sector. It also showed little interest in capitalising on the sector's knowledge and in incentivising moving upward on the technology ladder, nor in connecting with the national agriculture R&D centres. The role of EHDA (the lead agency) barely moved away from the initial stage of support. Instead of supporting and promoting the sector, it turned into a bureaucratic machine that merely compiles data produced elsewhere and publishes reports (yet there are significant quality problems in the database).

Moreover, the responsiveness of the government to the sectors' demand appeared to decline as it took relatively long to take action on proposed issues. For instance, a draft called 'Consolidation Directive Proposal' was submitted in 2014 asking to permit operation of intermediate firms (service providers) that could collect flowers from various growers and export. The major aim of the proposal was to tackle

[48]According to the NBE Directives No. FXD/02/1996 there are different foreign currency retention schemes and eligible exporters of goods and services can retain up to 30% foreign currency earnings in their dedicated accounts but they can only keep the 10% in their account and they have to sell rest to 20% within 21 days.
Directive no. FXD/28/2006 full net earnings from flower export (after deducting market related costs) to be repatriated within 90 days of export permit issuance by local eligible banks.

the scale problems usually faced by local firms, but the proposal remained pending for a couple of years. The Proposal also attracted the attention of some importers/buyers at the auction. The interviews with an online trader at the Dutch auction revealed that his company has an interest in setting up a flower processing and exporting firm in Ethiopia, like operations in Kenya, if the Proposal allowed foreign firms to do so. But some domestic firms had opposing views regarding the entry of foreign firms into this very business (collecting product from growers and exporting) as it would undermine their bargaining power in the GVC. They rather preferred local firms to do it collectively, as it would strengthen their marketing capabilities and tackle their scale related problems.

Since 2016, especially after the attack on flower firms by political protesters, the government began to give renewed attention to the sector, partly to assure investor's security and to avoid investment fatigue. As some firms indicated, the political tension in this case has been a kind of blessing in disguise as the government finally began to listen to their complaints and it lifted the constraining import rule. And as of July 2017, the exporters were permitted to import by using CAD without blocking cash. The state also agreed to negotiate the repatriation rate and the Consolidation Directive Proposal has been re-activated for discussion. Furthermore, intending to develop new horticulture hubs, the government has made 5,100 hectares of new land available around Arbaminch, Hawassa, Alagae and Bahir Dar. As Addis fortune (newsletter) reported in October 2017, the prime minister announced cheaper loans and extended tax exemption for new investors in the sector. Local firms got a slightly more favourable condition as they are required to have only 15 percent equity to access soft loans from DBE; whereas the rate remained the same for foreign firms (30 percent equity).[49] Furthermore, government has restructured the lead agency under a new name - Ethiopian Horticulture and Investment Authority and with a new technocrat director.

The lead agency under its old name was stagnant and, in some cases, it seemed to have regressed. It failed to interact with the industry and evolve with its development and even to facilitate proper provision of services. One such example would be the power supply, whose frequent disruption raises cost of production in the industry. All firms have standby generators and as some firms indicated, their cost for running a generator reaches up to 200% more than the monthly fee they are supposed to pay for their power supply; however since the fee is very low it doesn't significantly affect the profit margin. During my interview in the agency with two members of management, they largely agreed with the views of the firms and also indicated the reason for the stagnation and failure of the agency. One of the managers mentioned that it was due to lack of power/authority to enforce the service providers. So, the new structure, moving from agency to authority, would solve this problem but at the same time he admitted that in terms of providing technical support, the agency is poorly staffed and had low

[49] https://addisfortune.net/articles/state-flowers-horticulturalists-with-more-incentives/ Last accessed in December 2017.

capabilities compared to the local flower firms. But the other interviewed member of the management compared the experience of the last two directors of the agency before restructuring took place. He explained that restructuring the agency would result in little change without the executive capacity and the political linkage of the new director.

The two previous directors operated under the same structure but the first one was able to draw power from his political linkage with the late Prime Minister Meles Zenawi, while the latter who directed the lead agency during the time of Prime Minister Haile-Mariam Desalegn and tried to follow 'the official line', failed to achieve any meaningful support to the sector. As the key informant explained, this was also partly because Prime Minister Haile-Mariam Desalegn himself had no similar power (unofficial) like Meles Zenawi. The manager anticipated that, given the existing institutional setting, the new technocrat director will face the same challenge unless the political system would change or he has strong political linkage to enable him to influence the bureaucrats in service organisations and beyond. Moreover, both managers agreed that improving the skills of staff and reducing the high turnover of experienced workers are critical. As a key informant explained, lack of capabilities in government agencies is increasingly becoming a common problem in the country, also within important ministries. Ethnic composition and political loyalty are among the most important criteria of recruitment, which seem to increase the chance of hiring less qualified individuals. Moreover, the overall quality of education has declined over the years, which contributed to the problem getting worse (Woldegiyorgis 2017; Rekiso 2019).

4.3.2. Ethiopian Horticulture Producers and Exporters Association

The association was established in 2002 by five early entrants. Currently, the number of members has reached over 90 and around 80 percent of them are flower growers, fully oriented to the export market which might have helped to create stronger common interest among members to work for the success of the association. Since its establishment, the association was chaired by the owner of Ethio-flora (one of the pioneer firm) who was aware of the failure of local industry associations of that time (for instance, leather export industry) and whose mistakes he wanted to avoid[50]. As mentioned earlier, he was also a vibrant business person with strong political connections and an international network.

The association further developed its capacity by creating solid partnership with the Dutch embassy starting from 2003, when the first Dutch trade and investment mission in the horticulture sector took place. Apart from that, right from the very start of the sectors' boom, four strong local business people including diaspora and one Dutch person were involved at leadership level as board members. This gave

[50]In an interview conducted by the author in August 2007, the chairperson of the flower industry association (the owner of Ethio-flora PLC) indicated that the association aspires to be a model industry association to old industries such as Leather and Garment.

the association a stronger foundation to successfully exploit knowledge brought by the partnership program with the Dutch and to support its members. The association remained a focal point for partnerships and coordination of activities undertaken by various actors (state and non-state) that supported or influenced the industry and lobbied government. Apart from representing the members nationally and internationally, it initiated and implemented projects (individually and/or jointly with others) including a strategy for an export-oriented horticulture sector in Ethiopia, which was developed by Dutch experts. In addition, the association organises and takes part in international events like global flower expos or Horti-Fairs that are important to promote and brand the Ethiopian industry. It also provides general updates (technical and market) on the global floriculture industry, identifies potential markets, facilitates new entrants (provide information about the local context, rules, regulations what to do and where to get what, etc.) and provides training to achieve compliance with the sector specifically with regard to the code of practice discussed below. Moreover, based on their needs, firms can book with EHPEA to get tailor-made training.

More importantly, EHPEA working in collaboration with the Netherlands and the government-developed sector specific systems of innovation, in which the knowledge is primarily provided by the Dutch, coordinated by the association and with the blessing and support of the government. One of the most important joint activities of the three partners is the development of a sector specific standard with three levels: Bronze, Silver and Gold. This has enabled the sector to increase its international recognition and to compete globally. Although poorly enforced, the Bronze level is recognised as a legal minimum in the country. Moreover, international acceptance of the local standards has increased as the Silver level was recently benchmarked with GLOBALGAP and EHPEA is member of FSI 2020, in which the local standards are intended to be internationally benchmarked to achieve sustainability goals of the industry at global level. Many of EHPEA members (including local firms) have adopted global certifications such as MPS-ABC as well as more stringent ones such as Fair Flowers and Fair Plants (FFP) and Fairtrade. As part of implementing the local standards, EHPEA developed courses that are deemed necessary to meet the needs of the industry as well as individual farms. The courses and trainings are focusing on the areas of safe use of pesticides, good agricultural practices, farm safety, protection of the environment, internal auditing and human resource management. They are designed to address general workers (the labour at the bottom of employment pyramid), supervisors as well as management teams.

Due to the fact that Bronze level is a legal minimum, all farms are believed to get the required training to achieve this level of compliance, which extensively covers many fundamental issues that are needed to operate a flower farm responsibly (see Box 4.1). Several local firms referred to this training as a helpful instrument to improve their practice. Especially for general workers, it appeared to be a source of information about their health and safety in relation to chemicals. Some firms abandoned the local minimum standard for long time as there is no proper follow up. For example, if a farm is certified for Bronze, the EPHEA does not monitor compliance unless a firm applies for upgrading to the Silver level.

Despite the crucial role of the association for the development of the sector, it is largely focused on tackling on-going constraints and lobbying government for conducive policies and services, while having limited vision to initiate higher technologies such as R&D in new varieties and environmentally friendly growing media, etc. This is partly due to the government failing to play its role. According to the interview with the EHPEA management, the association is overburdened with lobbying government for many things that needs doing: "…we spend hours on these to tackle problems in service provision, input related policies, quality of education to produce trainable skilled labour …on top of that, the government expect us to coordinate internships with farms…they want us to do everything…well, how about the government agency doing some of those things…?!"

Box 4.1. Requirements of EHPEA-COP (version 4.0.) for each level certification

Bronze level

Farms are required to have a basic management system in place that ensures the planning, monitoring and evaluation of key sustainability issues. Farms must also implement safe working practices, protect the environment and comply with the Law of the Land as described below:

- Have put in place a basic management and farm auditing system.
- Measure, document and evaluate every month its performance on water consumption, pesticides use, fertilizers use, and energy consumption
- Have assessed risks related to environment and occupational health and safety and has put in place suitable mitigating actions to provide safe working conditions and protect the environment
- Not purchase, store or use internationally banned products, (Stockholm Convention) and unregistered (excluding temporary permission to use products) pesticide products as per the Ethiopian Pesticide Registration and Control Proclamation 674/2010
- Implement good housekeeping and safe working practices with regard to the storage, use and disposal of Pesticides Concentrated Acids and Fertilisers
- Provide training for staff to enable them to work safely and correctly in the tasks that they are employed to carry out and implement responsible employment practices in accordance with the Ethiopian Labour Proclamation, 377/2003
- Explain the terms and conditions of employment to all staff at the start of their period of employment on the farm
- Have developed emergency procedures to be used in the event of an accident occurring and be able to provide First Aid treatment on site with further medical care at the local clinic if necessary

Silver level:

Farms are required to give more attention to implementation of good agricultural practice, protection of the environment and the welfare of employees. Production needs to be Safe, Ethical and Green and the approach to sustainability changes from being reactive to being proactive.

Requirements for Silver Level compliance include all the requirements for Bronze level but in some cases a higher level of performance is expected:

- Provide further training for internal auditors to enable them to carry out a full environment and social Audit
- Implement Good Agricultural Practices and ensure that pest management is achieved with a minimum use of pesticides and impact on the environment
- Protect the soil from degradation and erosion and use water responsibly with due regard to other users and the sustainability of the source
- Be proactive in making improvements to waste management and disposal procedures and focus on minimisation and re-cycling wherever possible
- Be proactive in encouraging workers to form a Committee or Union and to engage in Collective Bargaining
- Put procedures in place for involving all levels of farm staff as appropriate in the development and implementation of procedures that lead to Code compliance and in training to enhance their health and wellbeing
- Implement improved/higher levels of Occupational Safety and Health and social welfare provision for employees
- Implement a formal 'Complaints Procedure and be responsive to the comments and concerns of stakeholders
- Show year on tear improvement in their environmental and social performance

Silver level of the Code Version 4.0 will be benchmarked with Global GAP and ETI.

Gold level:

Farms wishing to achieve compliance at Gold Level are required to show compliance with all requirements at the Silver Level at the time of being audited for the Gold level. The Gold Level enables the Ethiopian flower and ornamental plant farms to meet good sustainable flower cultivation practices demanded by the high end European retail sector and niche markets. Compliance at Gold Level challenges the farm to go beyond normal market expectations and to become involved in Corporate Social Responsibility projects, Conservation and Product Quality Management and to make a real contribution to the sector by participation in development activities and offering Practical Management training for new graduates.

Source: EHPEA website[51]

4.3.3. Dutch development program

The Ethiopian floriculture industry have received considerable support from international donors and development cooperation at different phases of its development, but as indicated above, the most

[51] http://www.ehpea.org/files/downloads/EHPEA%20Code%20Version%204.0.pdf accessed April 25, 2016.

prominent support came from the Dutch government and its support was broadly linked to building sector specific institutions. In 2003, at the time when the Ethiopian government launched the industrial policy, the Dutch government, with its keen interest in the global floriculture industry, was eyeing Ethiopia as a new production site. Apart from trade and investment missions organised by the Dutch embassy in Addis Ababa, in 2002 the Dutch government added Ethiopia to its list of countries that are eligible to receive special funds under the program called The Programme for Cooperation with Emerging Markets (PSOM). This fund was established in 1998 by the Dutch Minister for Development Cooperation with the aim of contributing to poverty reduction by stimulating sustainable investments in innovative businesses in selected developing countries (Triodos Facet 2010). PSOM (currently replaced by the Dutch good growth fund) provided a grant of up to 60 percent of the cost of the project and where recipients were required to form a joint venture with local business and to adhere to the MPS standard.

Although this effort was not matched by the Ethiopian government's industrial policy, which made no attempt to encourage joint ventures between foreign and local investors; several joint venture flower farms and sector specific service providers were created by this program. As of 2007, seven flower farms and two supporting services (Ethiopian Perishable Logistics Company and Horticoop, which provided essential laboratory services[52]) were established with a PSOM grant. However, the local partner often had an insignificant share in the joint venture and little participation in management of the business. In addition, they got limited or no dividends due to transfer pricing, in which the subsidiary in Ethiopia was often there to be a loss maker while the profit was accrued in the Netherlands where the mother or subsidiary company was located (Taylor 2011). For instance, a joint venture firm that was interviewed during firm survey indicated that although the local partners owned 25 percent of the share, they had limited participation in management and there seemed to be no dividends, as the firm had declared a loss since its establishment in 2008. Overall, PSOM might have contributed to the development of the industry in terms of introducing international standards and expanding sector specific services, but its support in terms of increasing local firms' entrance to the sector or building their capabilities appears to have been limited. However, there are exceptions, two joint ventures created by PSOM were transferred to full local ownership.

Next to PSOM, the Ethiopia-Netherlands Horticulture partnership that ran from 2006 to 2012 was key to creating national innovation systems. The partnership intended to support the development of the industry through an extensive capacity building program, which included creating codes of practice, a phytosanitary unit, integrated pest management and a decision support system for selecting new production areas. Moreover, it also covered provision of market and sector specific information and study tours to different countries as well as development of an investment guidance manual for

[52] This laboratory services include soil analysis, which is required to establish a base for formulating fertilisation plan DLV Plant (2012). According to the experts Spurway analysis is better soil analysis as it has a direct relation with a crop's performance than general soil analysis. Soil analysis has to be done regularly, like every three months. The soil laboratory service that was established in joint venture and later transferred to full local ownership.

floriculture (Helder & de Jager 2007)[53]. Additionally, at farm sites, Dutch consultant firms such as DLV-Plant advised and coached individual firms on specific functions and CBI provided several trainings including a master level class given to firms that appeared committed to stay in the industry. Another phase of the partnership program that was launched by the two countries and run for three years (2014-2016) organised coaching and on-site trainings on specific topics, targeting investors from developing countries such as local and Indian firms. The program covered issues like marketing, post-harvest and cool chain management, corporate social responsibility and human resource management. Following the new expansion plan of Ethiopian government, the newest partnership phase has been announced to run for another four years (2017-2021) focusing on similar areas mentioned in the earlier two phases.[54]

4.4. Conclusion

The chapter described the emergence of the floriculture export sector in Ethiopia by roughly dividing the sector into five phases and identified major factors that drove its development. The initial experiments of export production of flowers began with two local entrepreneurs who were able to secure international donors' support to access the necessary resources. Following some changes in macroeconomic and trade policies of the country, the sector began attracting more firms including the first FDI that introduced more advanced greenhouse technologies. The selective industrial policy that was launched in 2002-2003 provided enormous incentives and support to the sector, which in turn attracted large numbers of local and foreign firms including FDI with important experience and scale such as the Dutch farm Afriflora. In 2015, the total cultivated land reached 1,623 hectares with 66 actively exporting firms generating US$225 million in foreign exchange. The development of the sector also induced investment and employment in other activities through linkages to the packaging industry and to Ethiopian Airlines, which led to a substantial growth in the airline's logistics and perishable cargo lifting capabilities. Nevertheless, the growth of the sector slowed down after 2008 and several local and foreign firms collapsed, while at the same time new ones entered the sector but at a lower rate than before, which made the overall sector stagnant. Especially, the number of local firms decreased from 38 in 2006/7 to 15 in 2016.

[53] Some of the results of the Ethiopia-Netherlands Horticulture partnership program are presented in a Dutch government evaluation report of 2009, available at https://www.government.nl/documents/reports/2009/03/01/review-of-the-wssd-public-private-partnership-program-in-ethiopia

[54] The Dutch government also implemented similar partnership programs in other African countries. For example, partnership program called 'Capacity Building and Market Access' implemented in Kenya, Zambia, Uganda and Tanzania. The programs were focused on export product of cut-flowers, cuttings, fruits and vegetables (de Boer and Pfisterer 2009).

The chapter identified three key driving factors of the sectors' development and discussed their role. The industrial policy, the industry association and the Dutch development program played crucial role individually as well as joining their efforts in private public-private partnership programs coordinated by the industry association. The industrial policy reduced entry barriers to both local and foreign firms by providing non-discriminative incentives including cheap finance, land, tax and import tariff exemptions. Through setting up various coordinating committees and a lead agency, it also played important role in tackling infrastructural constraints and facilitating the development of local standards. However, the performance of the major incentive allocating agencies such as DBE showed limited success in record keeping on its loans, let alone devising criteria, monitoring performance and enforcing penalties in such ways to create pressure on firms to put in technological effort. Furthermore, sector specific institutions such as EHDA lacked the capabilities and the political will to support the industry. Overall, the experience of the two public institutions points to challenges beyond the learning problem that is discussed in Chapter 2 and connected to the political settlement, which is prone to corruption, unconducive to nurturing skills in the institutions and less motivated to properly manage and enforce incentives. These might be the main reasons why the industrial policy failed to achieve the clearly stated targets in the policy papers, in terms of cultivation and employment.

The other key player identified in this chapter is the industry association, which remained rather vibrant and exceptionally strong for Ethiopian business associations. Its role has gone beyond representing its members, it initiated and implemented several projects to develop their capacity and build the image of the sector at an international level in partnerships with government and more importantly, with the Dutch development program. Together with the latter partner, who provided the necessary knowledge, the association has been central in developing sector specific systems of innovation such as developing sector specific standards and training centre. Furthermore, although poorly enforced, the Bronze level of the local standard became a statutory minimum. However, the association association's role is limited in relation to initiating activities that trigger an upward move on the technology ladder such as R&D in new varieties.

Regarding the industrial policy, despite attracting several FDI, it didn't show similar effort to induce knowledge spillovers. Although it had stronger potential in creating effective systems of innovation, the industrial policy appeared to be the weakest element which undermined (implicitly) the performance of the other components in the system. Nevertheless, the three factors (industrial policy, the industry association and the Dutch development program) were key in driving the development of the sector. The next chapter will show whether these factors will have a similar role in driving local firms' process of upgrading and building TC, through closely investigating the survived local firms and assessing their TC which includes, among others, measuring their linkages with those institutions, policies as well as with FDI.

Source of images: author

5. Ethiopian-owned firms in the floriculture global value chain: With what capabilities?

5.1. Introduction

Understanding the process of firms' TC building and upgrading necessarily requires assessing their existing level of TC and this chapter aims to do so using the floriculture TC matrix that is presented in Chapter 3. It measures and analyses the TC of the Ethiopian-owned firms that survived and learned to compete in the floriculture GVC, drawing primarily on the firm survey and also from interviews conducted with institutions and market actors. Aiming to unpack the firms' overall TC trend, the chapter also examines the relationship between capability scores of firms and their export trajectory and competitiveness.

The next section of the chapter presents an overview of 13 local firms out of 15 that existed at the time of this research (2016). The thesis defined ownership of local firms, as indicated in Chapter 2, considering factors beyond their official nationality, that potentially create differentiated access to knowledge and other resources. Thus, four types of ownership were identified: indigenous, diaspora, party owned, and MIDROC owned. Except for one firm, all local firms had no prior experience in the floriculture export sector, or horticulture in general, before investing and they were attracted to the sector largely due to investment incentives provided by the industrial policy. However, all local firms have a background linked to a family-owned diversified business group and/or have set up other domestic market-oriented businesses after joining floriculture export sector.

The third section of the chapter measures local firms' TC based on four capability categories: investment, production, linkage and end market capabilities and discusses the methodology followed in measuring the TC, the selection of indicators and the scoring technique. To measure each of the four categories of capabilities, four to seven indicators were selected, comprising both qualitative and quantitative measures. The firm received a score of low, medium or high, which was translated numerically as 1, 2 or 3, respectively. The result of the scoring is presented in the fourth section and shows that most of the local firms considerably developed their capabilities since entering this new export sector, but not in a uniform manner across all categories of capabilities. As the aggregate capabilities scores of firms indicate, five of them built capabilities to the level of medium and above, four firms appear slightly below medium (med-minus) while two firms show rather low scores. Variation in TC scores is not only seen across firms but also within each firm as only two firms (A-Rose and L-Rose) show uniform score across all categories of capabilities, which means that a firm does not

necessarily build all types of capabilities at the same time, which can be referred as selective deepening of capabilities.

The fifth section comparatively analyses firms' TC score, export trajectory and their competitiveness aiming to explain the non-linear and uneven process of firms' TC building. The result reveals the complex relationships between export diversification and consistency at end market/sales channels, which determines firms' competitiveness in terms of capturing higher prices. Firms with export trajectory of diversified market/sales channels face a challenge to maintain the consistency at the auction that is needed to capture higher price; whereas firms that specialised in auction channel (auction deepening trajectory), through selective deepening, manage to get a higher price regardless of their overall TC score. The last section summarises the key points discussed in the chapter and indicates some of the remaining gaps in understanding, related to firms' TC building and the uneven processes, that need to be further examined in the subsequent chapter.

5.2. Basic characteristics of local firms in floriculture exports

In mid-2016, there were 15 Ethiopian-owned firms and most of them were described by an industry expert as 'gold tested by fire', due to their resilience resulting from dealing with industry after-shocks from the global financial crisis that began around 2008. All of these firms were engaged in export production of roses in various locations with altitudes ranging from 1800 meters to 2500 meters, alongside several foreign firms operating in the same cluster. Five of the local firm were located in Debrezeit or Bishoftu cluster, another five in Sebeta, while the rest were in Holeta (2), Bahir Dar (2) and Awash (1) clusters. Most of the firms produced intermediate roses (50-60 cm length) and T-hybrid roses (60-80cm) roses; while a few firms produced a smaller share (less than 40%) of sweetheart roses (30-40 cm).

The ownership of the flower firms can be classified into four groups. Five firms are owned by indigenous Ethiopians and are part of a diversified family business group, with existing firms in various sectors such as trading, manufacturing and service but not previously involved in business related to floriculture. However, this group includes one of the pioneer firms, which compared to all the other local firms had accumulated significant experience in horticulture export production, although not in roses. Another five firms are owned by Ethiopian diaspora who had foreign citizenship and lived abroad for a long period before they returned to Ethiopia. Before their return, most of them (only one could not be confirmed) were engaged in professional business (such as bank and engineering) in their host country. With the exception of one firm (diaspora owned), all of these indigenous and diaspora firms have background connected to having family businesses, but they were not necessarily involved in running the businesses, especially the diaspora owners. But once they returned to their home country, they invested in one or more businesses alongside floriculture and some of them set up their floriculture firm

under an existing umbrella of their family business. Moreover, apart from one owner with secondary educational level, all indigenous and diaspora flower firm owners have attended tertiary education.

Two firms are owned by endowment funds that are affiliated to political parties in the ruling coalition government of the EPRDF[55]. One is owned by the Endowment Fund for the Rehabilitation of Tigray (EFFORT), which is affiliated to the Tigray Front Liberation Front (TPLF), and the other is owned by *Tiret* Corporate and *Gafat* endowment (both are under the Amhara national regional rehabilitation and development fund) affiliated to the Amhara national democratic movement (ANDM). The endowment funds are led by top politicians and play a significant role in the country's economy, particularly EFFORT which appears to dominate almost all spheres of the Ethiopian economy: agriculture, manufacturing, mining, construction, transport, import and retail. The remaining three local firms, are owned by Sheikh Mohammed Al Amoudi, born in Ethiopia of mixed parents (Ethiopian and Saudi Arabian) and runs various business conglomerates in Ethiopia and elsewhere. Like EFFORT, the companies of Al Amoudi, MIDROC investment group and MIDROC technology, are dominant players in diversified sectors of the Ethiopian economy. Of the total 15 firms, 13 were included in the local firm survey and are listed in Table 5.1. (under anonymised names). Two of the three MIDROC flower firms are not included in the survey, because their ownerships were identified at a late stage of fieldwork. The firms are anonymised and thus listed as Firm A-Rose, B-Rose and so on.

Local firms have been operating in the industry for 5 to 13 years, and on average they employ 464 workers and have a landholding size of 45 hectares, out of which 19 hectares was cultivated with 12 rose varieties. Most of the firms (10 out of 13) financed their investment using loans from the Development Bank (DBE), two firms used a private bank loan, while one firm used a DBE loan and PSOM (a Dutch subsidy) in a joint venture with a Dutch firm (but during this research period, the ownership was fully transferred to the Ethiopian partner).

[55] Claiming to redress the socio-economic injustice, the EPRDF government created a new type of economic actors known as *Endowments*. Endowment companies are claimed to be non-private and non-party but in practice they are controlled by the ethnic based political parties and led by senior party members. They participate in wide range of economic activities of the country and usually connected to large-scale corruption and economic distortion through the political and economic oligarchy (Abegaz 2013; Gebregziabher and Hout 2018).

Table 5.1. Overview of Ethiopian-owned Floriculture Firms

Firms	Ownership	Year of export started	Land holding size (ha)	Cultivated land size (ha)	Numbers of workers	End market share %	Certificates	Export value 2015 in US$ and in millions*	Export volume of local firms 2015 and in millions*	Export share of local firms (%) 2015*
A-Rose	indigenous	2005	36	26	550	auction-64% online-22% Middle East-13% Japan-2%	FFP	1,865	14,466	7
B-Rose	indigenous	2003	126	27	710	auction & online-70% Middle East-30%	MPS-ABC	2,066	14,170	7
C-Rose	MIDROC	2006	28	16	400	auction-70% Middle East-20% Japan-10%	MPS-ABC, SQ	2,208	15,183	8
D-Rose	indigenous	2006	30	20	520	auction-2% direct-43%(NL, UK) Middle East-50% Japan-5%	MPS-ABC, SQ	2,215	18,769	8
E-Rose	diaspora	2005	20	15	420	auction-74% auction-direct 25% Middle East 1%	FFP	3,947	28,370	14
F-Rose	diaspora	2009	40	10	260	auction-99% Middle East-1%	MPS-A SQ	1,320	11,628	5
G-Rose	diaspora	2006	20	18	300	Middle East-70% direct-30% (Spain, Greece, Italy)	none	1,144	7,814	4
H-Rose	party	2010	17	5	160	auction-100%	none	0	0	0
I-Rose	indigenous	2005	39	11.5	200	auction & online-100%	none	0	0	0
J-Rose	party	2011	124	38	955	auction & online-85% Direct-10% (Russia & Italy) Middle East-5%	MPS-ABC	5,039	43,939	18
K-Rose	indigenous	2008	54	27	675	auction-75% direct-10% (NL & Norway) Middle East-15%	FFP	3,920	29,894	14
L-Rose	diaspora	2006	31	17.5	480	auction-84% USA-10% Middle East-1%	MPS-B; Fairtrade	2,667	24,254	10
M-Rose	diaspora	2008	22	12	400	auction-99% Middle East-1%	MPS-ABC	1,740	12,890	6
Average			45	19	464					

Note: *EHDA is the source of the data. But the rest is collected directly from the firms through the survey

5.3. Measuring actual technological capabilities of firms in the floriculture global value chain

As discussed in earlier chapters, firm surveys were conducted with 13 local firms and based on the results, the indicators in the floriculture GVC technological capabilities matrix were formulated into four categories of TC: Investment, production (product and process), linkage and end market. To measure each of the four capabilities, four to seven indicators were selected from the survey questionnaire. For each indicator listed in Table 5.2 below, the firm received a score of low, medium or high, which was translated numerically as 1, 2 or 3, respectively. But sometimes a score of zero (0) is given when firms don't implement the activities in question (indicator) or in case of Yes/No questions. Based on the individual indicators, a firm was given a sum score for each capability category, and then an aggregate technological capability score. Initially, the idea was to give a score for the GVC function in which a firm operates: GC-subcontracting, grow, cut & pack for export (GCP); flower design and bouquet (FDB); commercial propagation and cuttings (CPC) and breeding new varieties (BNV). However, since all local firms participate only in GCP, it does not make a difference in the scoring result, and consequently it is not included here; but would be included if scoring Ethiopian-owned flower firms in comparison to Kenyan-owned flower firms, for example. The indicators chosen to measure each TC is presented in Table 5.2 and the exact method of scoring is explained below in the context of each indicator.

The selected questions, and thus indicators, consisted of questions where the answer was a number, and questions that were open-ended. In this way, the indicators are not biased towards what can be counted. For open-ended questions, the firm is scored based on a subjective assessment of the firm's performance using the answers provided by the interviewee. The questionnaire and the scoring process were devised in a way that applied global industry standards to assess the capabilities of firms in Ethiopia, but the context and the development stage of the country is accounted for. Which means, global standards are used whenever applicable or available, for example, sector specific international business standards. If not, national industry standards are used but in the absence of both, the scoring was done based on variations within the local firms.

Table 5.2. categories of technological capabilities and indicators

Categories of TC	Indicators of TC
Investment capabilities	*Feasibility study; Greenhouse types, Irrigation technology types, using foreign expertise during initial investment*
Production (product & process)	*Product complexities, Number of varieties, Number of export days per week, Average internal reject rate, International standards, Export value per worker, Export value per hectare*
Linkage	*Linkage with firms (local and foreign) in the industry, Linkage with the industry association, Linkage with national institutions; and Linkage supply/service linkage (input)*
End market	*Number of end market/regions, Number of direct buyers (in direct sales or auction-direct), Relation with buyers, and Marketing skills*

The exercise of measuring technological capabilities is done for 11 firms only. Two of the 13 firms (indigenous and party owned) are not included since they could not provide most of the required data during the firm survey. These two firms appeared to be on the verge of collapse at the time the survey was carried out and had not exported for at least the preceding three months.

Investment capabilities**:** investment capabilities are concerned with pre-investment, initial investment as well as on-going investment capabilities. Three indicators are used to measure investment capabilities: *feasibility study, types of greenhouse and types of irrigation.*[56] While conducting a feasibility study indicates the ability of firms to make pre-investment preparation, the other two indicate the financial investment capacity as well as technological sophistication of the capital goods. For the first indicator *(feasibility study),* firms were asked if they had conducted a feasibly study before making investment in the sector and a score of 1 or 0 is given based on the response (Yes/No). Regarding the second indicator (*types of greenhouse),* firms with greenhouse of wood frame and plastic or net were given a low score; and a medium score was given to greenhouse with metal frame and plastic, without special properties in which climate inside greenhouse depends on natural ventilation through adjustable and/or fixed top windows. Whereas firms that had greenhouses with special properties like light diffusing, assimilating plastics or glass, computerised climate control were given a high score.

For the third indicator (*types of irrigation),* overhead and hoses type of irrigation technology scored low, drip irrigation with computerised fertigation on fixed hours scored medium, while drip irrigation with automatic fertigation based on climate and soil data scored high. Furthermore, the on-going investment

[56] Van der Maden et al (2012) used as main reference in relation to technical knowledge about the sector.

capabilities are implicitly measured in other indicators associated to the rest of capability categories as this investment abilities are a continuous process manifested across all capabilities. For the fourth indicator (*using foreign expertise)* firms were asked if they used foreign expertise during their initial investment and in setting up their operation, then a score of 1 or 0 is given based on the response (Yes/No). Furthermore, post-initial investment capabilities of firms are implicitly measured in all other indicators, as it is an on-going process embedded in and manifested by the other capability categories. Nevertheless, some aspects of investment capabilities, like initial as well as on-going search and selection are difficult to capture and measure with survey method and in scoring exercise. In addition, acquiring such kinds of information requires repeated contact and in-depth interviews. Thus, some of these issues, such as initial investment preparations, subsequent procedures in setting up and launching operations that were found to be similar across firms, will be discussed in the analysis while the next chapter will provide more detailed insight through firm history narratives.

Production capabilities: production capabilities are concerned with aspects of product as well as process and particularly in floriculture expect sector the two (product and process) largely overlap. Thus, as presented in Table 5.2 above, production capabilities are measured using seven indicators that capture product or process or both aspects: *1) product complexities* used to assess the product portfolio of the firms and their access to exclusive varieties. If firms produce mainstream summer flowers, it is given low score in product complexity, but if it grows roses (sweetheart and T-hybrid roses) it scored medium; while firms that produce more than one types of flowers such as roses and summer flowers or if they have exclusive varieties in any of their product portfolio, it is assumed to be an indicator of higher product complexities. In case of *(2) number of varieties*, the larger the numbers of varieties a local firm has, the higher capabilities it indicates. It is assumed that growing and exporting more varieties of roses requires specific technical knowledge about each of them and their influence on each other for instance, related to disease. It also indicates a firm's potential to reach different sales channels/end markets but there is no general standard regarding the 'optimal' number of varieties. It was not possible to find reliable data on the average number of varieties at the national industry level, so the scoring is done based on the context of the local firms where the average number of varieties is 12 (see Table 5.3 below). So, firms that have below 12 varieties scored low, 12 varieties scored medium and above 12 varieties scored high.

The third indicator used to measure product capabilities is (3) *number of export days per week.* Exporting for more days indicates a higher capacity of firms in planning their production and shipment. It also shows greater market presence, which is important in finding new buyers and establishing a position in a market. There is no reliable data found on the local industry's average export days per week, but the local firms export six days a week, which is used as benchmark for scoring. Thus, firms that export for below six days a week scored low, six days scored medium and firms that exported seven days a week scored high. (4) *average internal reject rate*: the lower the internal reject rate is the better the firm's

ability in managing the harvest and post-harvest process. Moreover, it can also imply a stronger production process that can generate export standard products with fewer rejects. For scoring, the overall experience of the industry is considered. As an industry expert estimated, the average internal reject of the Ethiopian industry is roughly five percent; given that the industry is dominated by foreign firms, including the Dutch-owned firms, the Ethiopian industry standard roughly reflects the international standard. Thus, firms with the internal reject rate of above five percent scored Low, five percent reject rate scored Medium and below five percent reject rate scored High.

Table 5.3. Performance of local firms in selected indicators of production capabilities

Firms	Export value per worker	Export KG/ha	Export stem per hectare	Export value per hectare	Number of varieties	Labour turnover rate	Average internal reject rate	Export days/week
A-Rose	3,391	18,584	556,371	71,740	14	40	3	7
B-Rose	2,911	19,820	524,829	76,538	12	50	12	6
C-Rose	5,521	35,090	948,924	138,030	11	25	5	7
D-Rose	4,260	27,772	938,469	110,763	16	10	3	6
E-Rose	9,398	66,533	1,891,341	263,151	11	10	4	7
F-Rose	5,076	34,074	1,162,773	131,973	7	20	3	5
G-Rose	3812	16377	434,114	63,550	18	10	5	7
J-Rose	5,277	34,290	1,156,294	132,620	21	25	5	7
K-Rose	5,808	37,452	1,107,181	145,204	16	20	4	7
L-Rose	5,557	39,338	1,385,941	152,428	15	25	4	6
M-Rose	4350	37354	1,074,174	145,013	7	25	5	4
Local firm's average	5,101	32,933	1,010,624	128,600	12	24	5	6
Industry average	5,545	31,053	N.A.	138,632	N.A.	20	5	N.A.

Note: For export data and number of workers, firms gave their estimate based on their 2015-2016 experience. However, compared to the data of EHDA, their estimate is a little bit overstated, especially for value. Consequently, EHDA data of 2015 is applied in the calculation of export value and export volume but number of workers taken as given by firms. Similarly, industry level figures are based on EHDA data and for number of workers experts' estimation is used (see Table 4.2 in Chapter 4).

The fifth and the sixth indicator for production capabilities is *(5) export value per hectare and export value per worker* which helps to roughly assess firm's competitiveness and labour productivity. Output (export volume) per hectare was considered but found less useful given farms' difference in agroecological conditions and product varieties. In addition, there is no national industry level disaggregated and reliable data that can serve as benchmark for each agroecological or cluster conditions, thus comparing each local firms' export value per hectare, as well as per worker, against the local industry average performance is found to be more reliable indicator. As shown in Table 5.3, the industry average for export value per hectare and per worker is estimated to be $138,632 and $5,545

respectively. Therefore, local firms that have export value per hectare and per worker below the industry average scored low, firms that have a value between average and 10% above average scored medium and firms that have a value of 11 percent above average scored high.

The fourth indicator is *(4) international B2B standards and consumer labels:* adopting international B2B standards, especially the dominant B2B standards such as MPS-ABC, SQ, FFP their certification and audit procedures have significant effect on local firms' organisational and managerial skills as well as in their information management system and quality control mechanisms. It also significantly influences firms' technical knowledge in labour management, protection of plant and environment. Moreover, certifying for a consumer label standard is assumed to reflect firm's ability to differentiate their product and reach niche markets to cater to socially and environmentally conscious segments. Hence, firms with no updated local or international standards scored zero (0), firms adopted minimum local standard or MPS-C scored low, firms that have MPS-B or C and consumer labels or MPS-SQ and scored medium and firms with consumer labels or MPS-SQ and MPS-A scored high.

Linkage capabilities: four indicators were selected to measure the linkage capabilities of local firms: *Linkage with other firms in the industry, with the industry association, with national institutions, and supply/service linkage (input)*. The industry association in Ethiopia provides mostly general services that are relevant and can be made available for all members but many inter-firm linkages, especially knowledge sharing including FDI spillover, can take place outside the formal institutions of the industry association. Therefore, in addition to participation in an industry association, firms were asked about their linkages with other firms and with national institutions. The two sets of questions were combined, and a subjective assessment was used in scoring each indicator. The first indicator is *(1)* a *firm's linkage with other firms (local and foreign) in the industry:* here firms were asked to rate their participation in any kinds of collaborative schemes (formal or informal) with other firms as limited, medium or high. Then they were asked to list the activities or schemes in which they participated. Based on the listed activities, I made a subjective assessment to give the final score. Hence, firms that have limited cooperation with both local and foreign firms (FDI) scored Low; firms that cooperate with both local and foreign firms with some general competencies such as sharing experience, hiring consultant jointly, visiting each other's firm scored Medium; and firms that cooperate with both local and foreign firms in some core competencies such as marketing scored High. Furthermore, specifically having medium and higher level of linkage with foreign firms is also taken to imply the existence of FDI spillover.

The second indicator is *(2)* a *firm's linkage with the industry association.* Firms were asked to rate their participation in the industry association as limited, medium or high, and then asked to list the activities and services in which they participated. Based on the activities listed, we made a subjective assessment to give the final score: member of the association but with limited participation in meetings scored low; members that sometimes attend meetings and use services scored medium; and members that participate

in meetings and actively take advantage of the services scored high. The third indicator is *(3)* a *firm's linkage with sector specific and research institutions.* Here also, the same steps as with the second indicator were applied to do the final scoring: no or limited link is scored low; medium links, such as accessing some supports, scored medium; and close links scored high.

The last indicator is a sort of supply linkage: *(4) importing fertilisers and chemicals internally.* This indicator is selected particularly because of the conditions in the Ethiopian national context. The key inputs (fertilisers and chemicals) are not produced locally so need to be imported by firms themselves or by independent local importers. Local firms reported that it is cheaper and safer in terms of quality and availability if they could import those inputs themselves, rather than buy them from local independent importers. But their capacity to do so is mainly constrained by lack of working capital in foreign exchange; however a stronger linkage with banks (good business reputation) and other actors (e.g. with politicians) can improve access. Considering those issues, scoring is done as follows: firms that locally buy all or imports only sensitive chemicals and fertilisers scored low, while firms importing around 50 percent and above of inputs internally scored medium. Scoring high is avoided since in the context of Ethiopia (also hinted by some firms), this process is likely to involve more corruption and political favouritism.

End-market capabilities: in global floriculture industry end-market capabilities are found to be very important in their own right, as well as in influencing most of the other capabilities discussed above. It refers to the overall capabilities of firms to meet the specifications of several buyers in different markets, their ability to establish stable relations with those buyers and their market knowledge and promotion skills. It is measured using four indicators: *number of end market/regions, number of direct buyers (in direct sales or auction-direct), relation with buyers, and marketing skills*. For the first two indicators, it is assumed that the higher the number of the end market/regions and the number of direct buyers that the firm has, the higher the capability of the firm. So, *1) number of end market or regions*: firms that export to one region scored low, two regions scored medium, and firms that export to three regions scored high. *2) number of buyers in direct sale/auction-direct*: firms that have one to three direct buyers scored low, with four to seven buyers scored medium, and firms with above seven buyers scored high.

Even though having larger numbers of export destinations and direct buyers can indicate a higher level of technological capabilities, as firms have to meet the requirements of diverse end markets, it does not necessarily show how good firms are at meeting these specifications in a consistent manner. The latter issues are very important in the global industry, which is characterised by stiff competition where supply of flowers often surpasses the demand. To remain competitive, firms not only need capabilities to find buyers (in case of the auction, to track their frequent buyers), but also to build relations with them. This process typically involves issues beyond meeting product requirements, such as regular communication,

negotiation, commitment and trust. In this regard, some qualitative assessment, such as measuring stability of buyer-supplier relation, can help to balance the measures of end-market capabilities.

To this end, firms' relations with buyers and their overall marketing skills were assessed using the last two indicators, and three steps were applied. In the case of relations with buyers, firms were asked to rate their relations with their direct buyers as stable, somewhat stable or ad-hoc. If they rated their relations as 'stable', then they were asked with how many of the buyers they worked for more than a year. A subjective assessment was applied in reaching a final score. For instance, if a firm has relations with half of its buyers for at least a year, 'stable' is granted; otherwise, the score is lowered to 'somehow stable'. In addition, for buyers in the Middle East region, the method of payment (credit or advance payment) is used to assess buyer relations, since firms indicated that they could sell to buyers in the region on a credit basis only if they have stable relations. For firms that use only the auction channel, if they regularly trace their buyers and sell to the same buyers, their relation is considered 'somewhat stable' but if they also engage with the same buyers in auction-direct as well, 'stable' is granted. So *relation with buyers (3):* firms who viewed their relation as ad hoc scored low, somewhat stable scored medium and stable scored high.

4) Marketing skills is the last indicator used to assess end-market capabilities. It is defined as the ability of a firm to develop a clear market strategy and implement coherent marketing activities, such as market intelligence, promotion and branding. Here the final score is the composite of several separate questions that were asked in different sections of the questionnaire, and in some of them, the three steps are followed. Firms were asked whether they have a marketing strategy; to list their marketing activities, promotion and branding, and how often they do them; and whether they have a marketing unit to do those activities. Their responses were subjectively assessed largely based on the level of investment, coherence and consistency. So, firms that have no clear strategy linked to its marketing activities score low; firms that depend primarily on their personal networks and firms that began implementing market activities guided by strategy in 2016 scored medium; and firms that have clear market strategies and implemented activities accordingly in a regular fashion scored high.

Table 5.4. Technological capabilities score of Ethiopian-owned flower firms

	(1) Investment							*(2) Production (product & process)*								*(3) Linkages*					*(4) End market*					*(5) Aggregate TC score*
Firms	ownership	function	feasibility study	greenhouse	irrigation	foreign expertise	*sum score	number of varieties	complexity	numbers of export days per week:	internal reject rate	standards & labels	export value per worker	export value per hectare	** sum score	other firms	industry association	public institutions	supply & service linkages	*** sum score	No. of end-markets	buyers in direct sales/ auction direct:	stability of buyer relation	marketing	**** sum score	(5) aggregate TC score = 1+2+3+4
A-Rose	indigenous	GCP	1	2	2	1	6M	3	2	3	3	2	1	1	15M	2	3	1	2	8M	3	2	3	1	9M	MMMM (Med)
B-Rose	indigenous	GCP	1	2	2	1	6M	2	2	2	1	0	1	1	9L	2	2	1	1	6L	2	1	1	1	5L	MLLL (Low)
C-Rose	Midroc	GCP	1	2	2	1	6M	1	2	3	3	1	1	1	12M	2	2	1	2	7L	3	3	3	1	10M	MMLM (Med-minus)
D-Rose	indigenous	GCP	1	2	2	1	6M	3	2	2	3	2	1	1	14M	3	3	1	2	9M	3	3	3	2	11H	MMMH (Med-high)
E-Rose	diaspora	GCP	1	2	2	1	6M	1	2	3	3	3	3	3	18H	3	3	1	2	9M	2	1	3	3	9M	MHMM (Med-high)
F-Rose	diaspora	GCP	1	2	2	1	6M	1	2	1	3	3	1	1	12M	3	3	1	1	8M	2	1	2	2	7L	MMML (Med-minus)
G-Rose	diaspora	GCP	1	2	2	1	6M	3	2	2	2	0	1	1	11L	1	1	1	2	5L	2	3	3	2	10M	MLLM (Low)
J-Rose	party	GCP	1	2	2	1	6M	3	2	3	2	2	1	1	14M	2	3	1	2	8M	2	1	1	1	5L	MMML (Med-minus)
K-Rose	indigenous	GCP	1	2	2	1	6M	3	2	3	3	3	2	2	18H	2	3	1	2	8M	3	2	2	2	9M	MHMM (Mid-high)
L-Rose	diaspora	GCP	1	2	2	1	6M	3	2	2	3	2	2	2	16M	2	3	1	2	8M	3	1	2	2	8M	MMMM (Med)
M-Rose	diaspora	GCP	1	2	2	1	6M	1	2	1	2	2	1	2	11L	2	3	1	2	8M	2	1	2	2	7L	MLMM (Med-minus)

Note: *sum score key: Low=2-3, Medium=4-6, High=7. **sum score key: Low=7-11, Medium=12-16, High= above 16.
***sum score key: Low 4-7, Medium=8-10, High= above 11. ****sum sore: Low=4-7, Medium=8-10, High= above 11

5.4. Analysing the Technological Capabilities of Ethiopian-owned Firms

The aggregate capabilities score of firms shows that most of them (six out of 11) built their capabilities to the level of medium and above, three firms appear slightly below medium (med-minus), while two firms show a rather low score. Variation in TC scores is not only seen across firms, regardless of ownership types, but also within each firm as only three firms (A-Rose, C-Rose, L-Rose) show uniform score across all categories of capabilities, which means that a firm does not necessarily build all types of capabilities at the same time and to the same level, which can be referred as selective deepening of capabilities.

On investment capabilities, the TC score showed that firms had the same medium level of investment capabilities. As indicated in the above Table 5.1, local firms entered the sector at different development phases of the industry, for example, B-Rose started operation in 2003, and J-Rose in 2011, which was considered as the latest or consolidation phase, while the rest of the firms started operation in between the two phases. Yet, in the survey all local firms reported undertaking similar investment preparations to enter to the sector and which shows rather high initial investment capabilities. This could be partly because of existing experience in the country (pioneers' and the first FDI) as well as proximity to Kenya, which created a basic understanding about the need to involve foreign experts to operate the business that is considered as new to the country and no local experts existed. As will be shown in the next chapter, the industrial policy also played role in disseminating the basic information about what is required in the form of a sample feasibility study.

Thus, all local firms conducted a feasibility study, which was also required to access finance, with the help of both local and foreign consultants. They set up their firm with broadly similar physical, operational and organisational structures, and they had similar modern plastic greenhouses with steel frame that were furnished with drip irrigation and semi-automated computerised fertigation systems. Only one firm (C-Rose) had a greenhouse with slightly advanced technology such as climate sensors, which was required to run basic operation in its specific location (higher altitude). All local firms began operations with foreign experts hired as consultants and/or as managers in some key positions for different time interval, some employed both foreign managers and consultants for longer periods, while others intermittently hired consultants. These foreign experts, mainly from Kenya, India, Israel and the Netherlands, were the principal source of knowledge, as they played a significant role in project execution such as setting up greenhouses, operational and organisational structures, and training key staff and managers. In addition, almost all of the firms selected their initial sales channel and varieties primarily based on advice from these foreign consultants. Most of the time the foreign consultants and experts came to Ethiopia because of the firms but sometimes firms hired foreign experts/consultants

who were already in the country working in the same sector for other farms or came to the country through international development programs, such as the Dutch, to support the sector/firms.

The firms underwent significant changes since the initial investment period (since they started operation until the time of survey), experiencing progress, setbacks and stagnant periods. Their ongoing investment capabilities and decisions have been shaped by accumulated knowledge ever since. For instance, all firms have learned about the greater risk associated with variety selection as well as the behaviour and the rules of breeders, which led them to invest more in searching and selecting varieties. Local firms used consultants' advice, imitation, and the feedback of unpacking agents at the Dutch auction as mechanisms to learn about varieties. They also began to reach out to buyers in different end markets and trade fairs to get more feedback that could help them to better understand the market trends and consumers' taste. In addition, some firms visited other farms in the country as well as abroad (mainly in Kenya) to gain insight on the characteristics of varieties. After such careful variety selections, several firms conduct a 'variety trial', which involved testing a variety for its growth, productivity, disease susceptibility, colour, vase life and so on. These trials were especially crucial if there were no other farms in the neighbourhood (in similar climate) growing the same variety.

On production capabilities, a larger share of the firms (six out of 11 firms) scored medium, two scored high, while the remaining three scored low. The firms generally produce similar types of roses (standard sweetheart and T-hybrid roses) and show a low tendency toward increasing product portfolio or access exclusive varieties. But they have developed considerable capabilities to deal with sizable numbers of varieties (most of them export over 12 varieties) as well as harvest and post-harvest processes. Production process is very important in cut-flower export production, which has a very narrow margin for failure. Flowers need to meet demanding phytosanitary, quality, and product requirements, and once cut, the flowers have to be transported to the airport quickly, efficiently loaded into cold storage facilities, and transported to end markets. Most firms exported daily or 6 days a week, which indicates that they managed to develop a stronger shipment planning and forwarding abilities alongside improving their market presence. Since air freight is their major cost component, firms tried to minimise market rejection through better quality control which sometimes means higher internal reject. However, only one firm (B-Rose) has a higher reject rate than the average of the national industry (5% reject), while the rest have below or equal to the industry average rate. Despite their effort to export only top-quality flowers, some firms (A-Rose, B, Rose, C-Rose and J-Rose) mentioned that their products are sometimes re-graded or occasionally rejected at the auction.

Furthermore, except B-Rose and G-Rose, all firms adopted international B2B standards, and a few also (A-Rose, E-Rose, K-Rose and L-Rose) certified for consumer labels to further differentiate their product. E-Rose, F-Rose and K-Rose ranked high in their MPS international standard (MPS-A), while others (L-Rose) ranked a bit lower (MPS-B). There are firms that have been certified for MPS-ABC and

SQ (socially qualified), but it is uncertain whether they can keep the standard since they delayed their latest audits (2015) for strategic deliberation, which included reviewing cost of compliance and the relevance of certification in relation to the GVC in various end market/sales channels. B-Rose abandoned its MPS-ABC standard due to an internal crisis the firm has faced for the past years, while G-Rose did not even implement the minimum local standard (Bronze level). However, all the firms acknowledged the advantage of the standards in terms of improving their record keeping, documentation, stock management as well as in providing tools to improve their internal hierarchy, as well as to design incentive schemes geared to disciplining and motivating labour. Retaining labour is a critical challenge among local firms, despite providing permanent employment contracts and paying a minimum wage of 750 to 900 ETB per month (equivalent to USD 35-42, in 2016). Except for G-Rose, firms provide work and safety related trainings, incentives and benefits for workers. Yet, most of the firms indicated that they faced problems with keeping labour stable (over 20% average turnover rate) and with securing a year-round sufficient labour force. This is not only linked to the prevailing low wage in the sector and internal characteristics of firms, nor unique to the floriculture export sector; but rather it is also a nation-wide constraint that has been noticed in other export sectors and is influenced by macroeconomic factors such as wage goods inflation, which hamper the overall social upgrading (Blattman and Dercon 2016; Melese 2019).

As Khan (2018) argued, ensuring a higher level of effort, at workforce level, is one of the most fundamental steps towards firms' competitiveness. Despite the positive role of labour turnover in enhancing knowledge spillover, a certain level of labour stability is essential to ensuring such effort (mastering technologies and improve productivity) amongst workers. Although the floriculture export sector largely needs a low skilled/unskilled labour force, it requires social skills (e.g. time keeping, understanding incentive schemes, work discipline), delicate handling, dexterity, and speed that can take repetitive practice to master. For example, firms indicated that a newly recruited pack-house worker usually needs two years to double her speed and three to six months to meet the average numbers of bunches per day. Moreover, as the operation is organised like an assembly line, the loss of one worker affects the performance of the whole team in that specific line, so high turnover means significant loss of productivity for firms. This is partly manifested by the productivity performance of firms as most of them scored low in both productivity indicators (export value per hectare and per worker). Only three firms showed above industry average performance, while K-Rose and L-Rose scored medium in both indicators, E-Rose scored high. Although the high labour turnover might be one of the factors that drive low productivity of firms, it cannot fully explain the variation in firm's productivity performance. As Table 5.3 shows, firms with similar levels of labour turnover does not show similar performance trends. In fact, G-Rose and D-Rose that reported the lowest turnover rates, are among the low performing firms in terms of productivity. The firm history narratives presented in next chapter highlights other possible

reasons for low productivity of firms, such as lack of timely replacement of old plants and supply of inputs and so on.

In terms of linkage capabilities, except for two firms that showed low linkage capabilities (B-Rose and G-Rose), all scored medium. Local firms have a certain level of cooperation amongst themselves and with some foreign firms, implying the presence of some FDI spillover. Spatial proximity (clusters) is important to develop certain types of cooperation, such as frequent contact between managers and information exchange, which is common in most firms; the exception being G-Rose that had limited connection with other firms. However, clustering does not seem to matter for cooperation on core activities, for instance, E-Rose developed cooperation with foreign firms outside of its cluster to enhance its marketing skills. Additionally, friendship between local and foreign firms (not in the same cluster) has emerged and resulted in knowledge transfer.

Regarding linkages with institutions, the local firms only acknowledged their industry association (EHPEA) as a vibrant and useful institution with which all, apart from G-Rose, had a good connection. In addition to representation, the EHPEA is an important node in the sector specific national innovation systems, linking them with the global industry as well as with national institutions. In contrast to strong linkages with the industry association, all firms reported weak linkages with sector specific support or any research institutions. The firms described EHDA, the lead government agency, as a dead organisation, emphasising the diminished government support and enthusiasm towards the sector. As discussed in Chapter 4, immediately after its establishment, EHDA played an important role in partnership with the industry association and donor organisations in implementing code of conducts and in facilitating foreign consultants to provide firm-level support. Local firms explained how the agency could evolve to support their contemporary strategic needs, especially in strengthening their marketing skills and the input supply chain. In relation to the latter, allowing foreign input suppliers in the country, supporting local input production, easing importing process are some of the areas the firms mentioned where the agency could play role to support the sector.

At the time of the research, the sector was heavily dependent on imported inputs, except for packaging materials which were produced locally, but as firms indicated, buying inputs locally (whether locally produced or imported by independent suppliers) is more expensive and less reliable (in terms of quality and availability) than importing it themselves. So, most of the firms try to import themselves. Nine firms import over 50% of their chemicals and fertilisers themselves, while buying a larger share of packaging materials locally; there were, however, a few exceptions such as G-Rose, which imports all inputs themselves. Furthermore, firms with higher capacity to mobilise finance integrated plant propagation did so in order to improve their efficiency by directly controlling the process and hence minimising delay and quality failures.

End-market capabilities is the last category of firms' capabilities measured here. Only four firms (B-Rose, F-Rose, J-Rose and M-Rose) scored low, while the rest scored medium and one firm (D-Rose) scoring high. The local firms export their flowers to one or more of the following five regions or end markets: Western Europe, Southern Europe, Middle East, Northeast Asia and North America. Seven of the 11 firms export to two regions, while four firms export to three regions. In addition, nine of the firms are engaged in direct sales (including auction-direct), and most of them have more than five direct buyers, while the rest have two to three direct buyers. At the beginning, marketing activities were a low priority for local firms; rather, they concentrated on building their flower growing capability in order to meet the requirements of the Dutch auction. Local firms developed their overall capabilities to various levels, as a result of having to meet the institutional rules of the auction as the minimum requirements of entering the global industry. As most firms indicated, when they meet the minimum requirements consistently, they usually enjoyed minimum of 10 percent profit margin but staying competitive in this specific channel is not as easy as accessing it, so as competition increases in the auction GVC and draws down their profit margin, firms began looking for other opportunities. Thus, over time marketing capability became one of the primary concerns of all operating local firms and most of them have been striving to diversify sales channels and end markets, while others tried to specialise in selected end markets/channels.

However, as discussed in Chapter 3, the governance in the floriculture GVC has distinct as well as overlapping features across end markets and sales channels, which can be related to legal requirements, consumer taste and/or buyers' individual specifications. All of them influence firms' capability building choice and decisions. For instance, specifications of individual buyers often go beyond these general conditions, setting their own requirements in relation to quality, volume and delivery. Buyers in the Middle East have less stringent specifications and yet sometimes offer a better price or involve lower cost compared to other end-market regions. In the Dutch auction, price is not just determined by supply and demand, but also strongly influenced by local firms' consistency, which is measured by the function of quality, volume and market presence. Fluctuation (beyond a certain limit) in any one of the three factors negatively affects the price of the product in the Dutch auction as well as auction-direct contracts. Therefore, in order to remain competitive, firms not only need capabilities to find buyers, but also to build relations with them. Nine of the firms reported stable or somewhat stable relations with half or more of their direct buyers, as they have had relations for over one year and are able to sell on a credit basis for their buyers in Middle East. Firms that sell via the traditional auction only (F-Rose and M-Rose) indicated that they trace their most frequent buyers on a regular basis, which shows somewhat stable relations while one firm (E-Rose) went one step further and established a direct sales relation within the auction system (auction-direct).

Accessing various end markets and establishing stable relations with buyers are influenced by the overall marketing skills of a firm, which is the last indicator used to measure end-market capabilities. It shows

the ability of a firm to develop a clear market strategy and implement coherent marketing activities such as market intelligence, promotion and branding. Unlike other indicators of end-market capabilities where several firms scored high, on marketing skills only one firm (E-Rose) had a high score, while four firms scored low and the remaining six scored medium. These low scoring firms (A-Rose, B-Rose, C-Rose and J-Rose) seem to act sporadically and lack a clear market strategy; they might diversify to a new market without necessarily conducting proper market intelligence and preparation. Some of them might invest in promotions and branding but lack consistency and commitment, partly owing to conflict of interest with their other diversified businesses. There are also firms that have recently invested in strengthening their marketing skills. For example, aiming to enter new or strengthening position in existing end markets, F-Rose, K-Rose, and L-Rose invested in market intelligence, consumer relations, business standards and regular promotions. In case of D-Rose and G-Rose, they specialised in direct sales and have the highest numbers of direct buyers but rely on their personal network to market their product in different end markets without necessarily investing in international business standards or promotion. Although both firms moved away from the Dutch auction to direct sales to Europe and Middle East, D-Rose is still closely embedded in the network of agents around the Dutch auction; whereas G-Rose is closely connected to the Middle East market.

In general, the Middle East market was useful to local firms because it allowed them to experiment at a lower cost such as selling products that failed to meet auction standards before committing to to exporting some share of their products in the end market; this in turn helped them to spread risk and stabilise income flow alongside learning about the characteristics of the Middle East end market. According to local firms, the Middle East end market also offers a prospect for functional upgrading, such as setting up a marketing centre located in Dubai or Saudi Arabia, which they consider an unviable move in the auction GVC. However, the governance in the Middle East chain provides little incentive to social upgrading and sustainable practices as there are no requirements to comply to any business standards. Although adopting standards does not directly result in capturing higher prices at the Dutch auction, it demonstrates suppliers' commitment to long-term business relations and facilitates access to new buyers in auction-direct, online trading, or direct sales with traditional wholesalers. Therefore, suppliers that already successfully operate in the auction governance structure and work in close interactions with unpackers have more possibilities to diversify to new markets (whether more or less demanding ones) than firms that exclusively operate in the Middle East GVCs.

5.5. Capabilities scores and competitiveness of firms

As the above discussion indicates, firms' export trajectory, defined by their targeted sales channels and end markets, is one of the most important factors that shape the capability building process of firms. This is because specifications and standards of the floriculture GVC in various end markets and sales

channels have implications for firms' decision-making in regard to which capabilities to develop and to what level, in order to access and stay competitive in those markets and sales channels. To explore this further, firms' aggregate TC scores are compared with their export trajectories and with some competitiveness measures such as price and profitability, as presented in Table 5.5.

Table 5.5. Export Trajectory, Technological Capabilities and competitiveness of Local Firms

Firms	*Export trajectory*	*TC score*	*Price**	*profit/loss*
E-Rose	Only auction deepening	MHMM (med-high)	5	profit
F-Rose	Only auction deepening	MMML (med-minus)	4	profit
M-Rose	Only auction deepening	MLMM (med-minus)	4	loss
G-Rose	Only direct sales to lower markets	MLLM (low)	N.A.	profit
D-Rose	Only direct sales to lower & higher markets	MMMH (med-high)	3	profit
A-Rose	Largely auction but diversifying to high & low markets via direct sales	MMMM (medium)	1	loss
L-Rose	Largely auction but diversifying to only high markets via direct sales	MMMM (medium)	3	breakeven
C-Rose	Largely auction but diversifying to high & low markets via direct sales	MMLM (med-minus)	2	profit
K-Rose	Largely auction but diversifying to high &low markets via direct sales	MHMM (med-high)	3	loss
J-Rose	Largely auction but diversifying to high & low markets via direct sales	MMML (med-minus)	1	loss
B-Rose	Auction & direct sales to low market	MLLL (low)	1	loss

Source: Based on firm survey and interviews.

Note: * Buyers and unpackers at the auction scored firms from 1 to 5 (5 the highest) based on their average price obtained at the auction. There is no data for G-Rose as it does not sell in the Dutch market.

As shown in Table 5.5, firms adopted various export trajectories, which can be broadly classified in three groups: deepening in the auction channel; diversifying into high or both high & low end markets via auction or direct sales or both channels; and concentrating in low markets using one or both sales channels. As explained in Chapter 3, the two main sales channels in the floriculture GVC can offer opportunities to sell the same type of product but with different quality attributes in both high- and low-end markets. Accordingly, Ethiopian-owned flower firms usually target both traditional end markets with more stringent requirements (e.g. Western Europe and USA are considered high markets) as well as less demanding ones (low markets) such as the Middle East or Dutch auction at the level of the auction's minimum requirements. Only two firms with low TC score (B-Rose and G-Rose) adopted the

latter export trajectory; while G-Rose targets the Middle East end markets using only the direct sales channel, B-Rose export trajectory involves both sales channels targeting Middle East markets and Dutch auction at minimum level. Both firms made a loss for several years due to crises, but G-Rose began making profit again since 2014, whereas B-Rose still incurring losses. The price performance of B-Rose is the lowest at the auction; but for G-Rose reliable price information could not be found as the firm doesn't sell via the auction.

The rest of the firms followed an export trajectory of either deepening in auction (which is high markets) or diversifying into high or both high & low markets via auction or direct sales or both channels. Firms with medium and above aggregate TC score (A-Rose, D-Rose, E-Rose, K-Rose and L-Rose) are the most profitable firms making no loss (in the case of E-Rose) or making loss only once or twice since they started operation over a decade ago. The other firms (C-Rose, F-Rose, J-Rose and M-Rose) that have overall capabilities of slightly lower than medium (med-minus) also show similar export trajectories. While F-Rose and M-Rose focused solely on auction channel with very small share (1%) irregular export to the Middle East, the other two more regularly try to diversify to the Middle East. These firms incurred loss three or more times in their five to ten years life span, but they were slowly improving their management and organisational skills. In terms of price however, firms that follow export trajectory of auction deepening (E-Rose, F-Rose and M-Rose) captures higher price than all firms that follow the diversifying export trajectory. Even when firms with auction deepening strategy have lower capabilities than the others. For instance, F-Rose and M-Rose have a lower TC score than K-Rose and L-Rose, but the former firms obtain higher prices than the latter.

The above discussion points to the complex relationship between firms' export trajectory, TC score and competitiveness. Export trajectory of firms appear to influence selective deepening of capabilities or overall capabilities trend. To certain extent, this can be explained by firms' price performance at the auction, as it is directly influenced by local firms' consistency, which is measured by the function of the three factors (quality, volume and availability of supplier in the specific sales channel). As previously mentioned, fluctuation in any one of the three factors adversely affects the price of the product in the Dutch auction and also impacts contracts in auction-direct. In addition to that, trust-based communication (personal as well as virtual) plays a significant role in boosting the three factors and hence the price. Firms might decide to selectively develop the capabilities that enable them to meet the rules of their targeted end market or sales channel and thus obtain a higher price in specific market. As firms choose to follow diversified export trajectory, they face a different situation. Rules of individual buyers and end market/sales channels are not completely uniform, so if firms want to sell in various end markets/sales channels, they might need to build or deepen several sets of capabilities in order to consistently comply with all rules of different end market/sales channels at the same time. This might include, but not be limited to, increasing productivity, expanding size of farm, introducing new varieties, applying different production processes, marketing skills and so on. Moreover, requiring suppliers'

consistency is not unique to the Dutch auction, it is rather common in both sales channels and in several end markets, but the degree of importance and the consequence of failure might vary. For instance, in the auction the penalty of inconsistency is a low price in the auction clock but in the direct sales channel the penalty of inconsistency might be going out of market or losing the contract, as buyers in those channels are often less tolerant of supplier's failure. Thus, in order to capture high prices, firms that follow diversified export trajectory need to build their capabilities to the level that allow them to be consistent in all of their chosen sales channels/end markets. Until their capabilities become high enough, those firms might choose to fail in the auction, where they face lower penalty than in direct sales channel.

Some firms that focused on the Dutch auction tried to deepen auction-oriented capabilities and get a higher price herein but with different levels of success, as was the case with E-Rose achieving a higher level than F-Rose and M-Rose. However, their sole focus on the auction allowed all three of them to meet one of the most important requirements of the auction: consistency in terms of quality, quantity and market presence better than the other firms that follow diversified end market/sales channels export trajectory and hence were able to procure a higher price. Some firms focused on less demanding end markets such as the Middle East, which required them to adjust certain production and marketing capabilities but not necessarily pressured them to invest in higher organisational skills or improve international competitiveness. Whereas, most of the firms, instead of targeting a single end market/sales channel, chose to diversify to several end markets with higher or both higher and lower requirements using either or both sales channels. But, as explained by their price performance at the auction, which is lower than firms that followed the auction-deepening export trajectory, they were not able to show higher consistency at the auction despite relatively high TC score. This means that the more diversified the sales channels/end markets, the more difficult for firms to be consistent in all markets requiring them to build their TC further to higher level.

5.6. Conclusion

This chapter measured the TC of local firms using the floriculture GVC matrix and was based on empirical materials generated through firm survey and interviews conducted with institutions and market actors. The results were analysed in terms of four categories of capabilities: investment production, linkages and end market; and several indicators were created for each category based on questions from the survey. Of the 13 surveyed firms, 11 of them were actively operating while two were struggling for their survival. The ownership of local firms included indigenous business families, diaspora investors and party-owned firms, as well as firms linked to Al-Amoudi's business empire. Except for one, none of the local firms had prior experience in the floriculture industry before investing.

The aggregate TC scores of firms showed that most of the local firms considerably developed their overall capabilities. Out of the 11 surveyed firms, only two firms scored low, while four firms scored

close to medium and the rest scored medium and above. However, only three firms showed a uniform score across the four capability categories, which means that firms did not build all categories of capabilities to the same level. In order to understand this uneven process, firms aggregate TC score is compared with their export trajectory, which is defined by their targeted end markets and sales channels. This is because specifications and standards of the floriculture GVC in various end markets and sales channels have implications for firms' decision-making regarding which capabilities to develop and to what level, in order to access and stay competitive in those markets and sales channels. Furthermore, the aggregate TC scores of firms was compared with some competitiveness measures (price and profitability). The firms broadly followed three export trajectories: auction deepening (focusing on auction only), focusing on lower end markets/sales channels, and diversifying to both higher and lower end market/sales channel. The findings pointed to a complex relationship between firms' TC score, export trajectories and competitiveness.

The chapter showed that some firms had a clear correlation between the TC score and competitiveness, other firms appeared with mismatching results: for example, exhibiting higher capability scores but lower performance in competitiveness measures. Although firms with diversified end market/sales channel mostly had higher TC score, their competitiveness (in terms of auction price) showed lower performance, in contrast, firms that followed auction deepening trajectory showed higher price performance regardless of their TC level. In other words, firms that specialised in the Dutch auction sales channel and developed the specific capabilities required to perform well in this market - consistency in quality, quantity and presence at the auction - obtained higher unit prices in the auction than local firms which operated in multiple market/sales channels, and thus had trouble achieving as high a level of consistency in the Dutch auction. This highlights the trade-off between export diversification and keeping consistency. Diversified export trajectory might enable firms to lower risks and stabilise their income but has its own challenges in relation to keeping consistency in all end markets/sales channels and hence affecting their price/market position. This mean that successful diversification requires a certain threshold level of TC, which is higher than what is needed for successful deepening in auction or in lower markets.

The comparative analysis showed export trajectory of firms appear to influence selective deepening of capabilities or firms' overall capabilities trend, but it didn't fully explain the uneven and non-linear process of TC building, since even when local firms adopted a similar export strategy, their level of capabilities varied. This chapter also didn't explain the rationale behind firms' choice of export trajectory; why and under what conditions some firms invested in building their capabilities higher and why other firms failed to do the same. Understanding of these questions requires more closer look at each of the firms and the internal and external dynamics that shape their choice and decisions. The next chapter will do that using firm histories method.

Source of images: author

6. Ethiopian-owned firms' investment in learning: firm history narratives

Note to readers: *this chapter includes detail accounts of firm history narratives which are not accessible online. Most of the respondents in the research requested strict anonymity, therefore, only the introduction, structure of the firm history narratives and conclusion of the chapter are presented below.*

6.1. Introduction

This chapter aims to understand why individual Ethiopian-owned floriculture firms invested in learning based on firm history narratives. As discussed in Chapter 1, 10 firms were selected for firm histories method and data was collected from the firms through repeated, in-depth interviewing with their owners and managers. This firm-level data was combined with the views of other interviewed actors, including market actors, key informants and institutions, regarding local firms in general and collapsed ones in particular. In addition, documents and website sources were used. Together, all these sources were used to produce an analytical narrative on each of the 10 selected firms.

The firm history narratives are presented in this chapter, grouped into three categories based on when local firms entered the floriculture export sector. This follows Figure 4.1. in Chapter 4, which presented the sector's development in five phases: initial experiment, early movers, take-off, maturity and consolidation/stagnation, but here the first two phases and the last two phases are merged to make three separate groups. These is because there is no significant difference in the merged groups in terms of their national and global contexts. In addition, since the story of the pioneers was already presented in Chapter 4, here it will only be briefly discussed to highlight the importance of prior experience in the pioneer's re-entry to the sector. Merging the phases also helps to keep good flow and structure of the narratives. The first group is *pioneer and early mover firms.* Pioneers refer to firms that entered the sector in 1990s during initial experimentation before the arrival of foreign firms and the targeted industrial policy. Early movers refer to firms that entered the sector soon after the arrival of the first foreign firms and the launch of industrial policy, which was around 2000-2003. The second group includes *firms at the take-off phase* of the industry, which is around 2004-6; and the third group consists of firms that entered *at and after maturity phase,* which means around 2007-8 until 2016.

The analytical narratives start from the owners' background and at the time of their entry to the sector, and then highlight how dynamic factors related to firm-specific characteristics, the national institutional context and global value chains influenced firms' decisions to invest in learning and the mechanisms

through which firms' learning occurred. In addition, they emphasise the dynamic nature of the static technological capabilities scores of firms presented in Chapter 5.

Table 6.1. below presented the main features of local firms, on which firm histories method was administered. It also indicates the strategy of firm selection for firm histories, which intended to capture variation among relevant dimensions of firms and their context that might influence individual firms' choice, their investment in learning and the causal relations such as TC score, export trajectory, entry period of firms and ownership types.

Table 6.1. Characteristics of local firms participated in the firm histories

	FIRMS	TC SCORE	OWNERSHIP	EXPORT TRAJECTORY	PERIOD OF ENTRY INTO THE SECTOR
1	A-Rose	MMMM	Indigenous	Diversified sales channel & end market	Take-off
2	B-Rose	MLLL	Indigenous	Diversified, low sales channel and end market	Early mover
3	C-Rose	MMLM	Diaspora	Diversified sales channel & end market	Take-off
4	D-Rose	MMMH	Indigenous	Direct sales, diversified end markets	Pioneer: re-entered in take-off
5	E-Rose	MHMM	Diaspora	Auction deepening	Take-off
6	F-Rose	MMML	Diaspora	Auction deepening	Maturity
7	G-Rose	MLLM	Diaspora	Direct sales, low end market	Take-off
8	H-Rose	n.a.	Party	Auction	Take-off
9	I-Rose	n.a.	Indigenous	Auction	Maturity
10	J-Rose	MMML	Party	Diversified sales channel & end market	Maturity
11	K-Rose	MHMM	Indigenous	Diversified sales channel & end market	Maturity
12	L-Rose	MMMM	Diaspora	Diversified sales channel & end market	Take-off
13	M-Rose	MLMM	Diaspora	Auction deepening	Maturity

Note: all firms in the table participated in firm survey and all firms in the yellow shed participated in both firm survey and firm history. Firms with n.a. are not able to provide data and they were at the verge of collapse.

The chapter uses these firm history analytical narratives to identify the factors that influenced individual firms' choices to invest in learning and to tease out the causal relations between investing in learning, how they learn and the outcomes in terms of the resulting technological capabilities. As discussed in the previous chapter, the particular export trajectory that a firm follows influences how it builds capabilities.

This chapter uses the firm histories to interrogate further the causal relations between export trajectory and which capabilities a firm chooses to build.

Although every firm has a distinct learning path, there are overlapping narratives across firms, especially starting from the take-off period, since all firms operated in the same national and global contexts. Certain factors in the history narratives of these firms are largely the same, such as initial steps of investment, learning via foreign consultants, and the role of the auction unpacker. Therefore, these overlapping factors are presented in detail only once under the narrative of A-Rose, which is the first firm presented in the second category of firms entering floriculture exports at or after the take-off of the industry. The rest of the narratives focus on the distinct features of each firm while only briefly touching on common ones. This structure for presenting the firm history narratives helps to keep the flow of the chapter and to minimise unnecessary repetition, but it also makes the narrative of A-Rose longer.

6.2. Pioneer and Early Mover Firms

6.2.1. D-Rose: strategist in cooperation and competition

6.2.2. B-Rose: early mover but trapped in diversified business groups

6.3. Firms at take-off phase

6.3.1. A-Rose: strong organisation and reluctant management

6.3.2. E-Rose: fast learner and strong management

6.3.3. C-Rose: capital and relations are not enough to build capabilities

6.3.4. G-Rose: isolated effort, crisis, switch to 'low road' competitiveness

6.4. Firms at and after maturity phase

6.4.1. F-Rose: capital investment vs learning how to learn; kinship vs expert management

6.4.2. K-Rose: high commitment and successful learning with rural labour

6.4.3. J-Rose: learning wastefully using 'right' bureaucratic structure in a 'wrong' business

6.4.4. H-Rose: resource rich but ownership poor

6.5. Conclusion

The chapter presented the analytical narratives of 10 firms with various ownership types that entered into the sector at its different development phases; that developed their technological capabilities to various levels and followed different export trajectories. The narratives of these firms with diverse backgrounds provided a rich understanding of their individual firms' choices to invest in learning. The chapter also illuminated how firms responded to dynamic factors in their global and national context, in terms of adding/dropping functions or deepening, upgrading/downgrading, which in turn helped to advance understanding about the complexities regarding firms' capabilities scores and their export trajectories.

It uncovered their individual ways of learning, major interactions during the process and the outcome in terms of building their capabilities. The firm history narratives showed that every firm had a distinct learning path, but their stories also showed significant overlaps, especially starting from the take-off period since all firms operated in the same national and global contexts. The firms entered the sector largely because of the same factors, which were: the government's sector specific incentives, they accessed knowledge through hiring foreign expertise, they were provided largely similar services by the unpacker at the Dutch auction, the industry association and the Dutch development program.

Nevertheless, firms that invested in the sector during the early phase faced a national environment that made the cost of learning higher, compared to firms that entered during all other phases, as there was limited knowledge about and support to the sector. In contrast, firms that entered the sector at and after maturity faced low cost of learning, as sector specific knowledge and service were widely available in one central location - at the industry association. Moreover, a significant skilled workforce had already been created in the sector, local firm owners and managers developed significant expertise and input

suppliers and foreign consultants were locally available. All these were relatively easily accessible to all newcomer firms, but this didn't necessarily ease the challenge of how to learn for the latecomers.

The firms' history narratives showed that regardless of at which phase the firms entered the sector, and the commonality of the context they shared, the firms differed in their ways of interactions with and utilisations of knowledge and services. The firms developed different strategies and management style and the owners showed various levels of commitment to the flower business, compared with their diversified business groups. These internal characteristics altogether determined how they learn, the level of their learning effort and the capabilities built.

The next chapter will further draw on the firm history narratives as whole and also on other empirical chapters to pull out the common and distinct conditions that shape local firms' investment in the sector, their main sources of knowledge and learning processes, which eventually led to building capabilities to various levels.

7. Drivers of Ethiopian-owned firms' investment in learning

7.1. Introduction

This chapter draws on the firm history narratives presented in Chapter 6 but also takes a broader view to include the other empirical chapters and addresses the specific research questions; explaining how industrial policy, the national innovation systems, FDI spillovers, GVC governance as well as firm specific issues influence local firms' TC building and upgrading process. It does so by pulling out the major factors that incentivised Ethiopian-owned firms' entry into the floriculture export sector, the major sources of knowledge for the local firms and their catalysts for learning, as well as factors that pressured the firms to put in technological effort.

As the second section of the chapter discusses, change in macroeconomic and political conditions was a triggering factor for local firm's initial experiments in the sector with the support of international donors. But starting from the take-off phase of the sector, industrial policy was the main incentive for investment in the sector. In addition, the Dutch development program also played role in incentivising investment in the sector by subsidising joint ventures. The third section explains that foreign expertise, innovation systems (horizontal relations and collective actions), the Dutch development program, to a less extent, FDI spillovers were important sources of knowledge and catalysts of learning for local firms, especially in the early phase of firms' physical investment and in mastering production level capabilities. Later on, relations with unpackers at the Dutch auction GVC became crucial as firms strove to deepen end-market capabilities, and to improve their position in the market in order to capture higher prices.

In the fourth section, the chapter presents the factors that account for the collapse of many local firms (over 19) and the survival of the 15 firms. By focusing on survived local firms, it also discusses the variation in technological capabilities scores among them. In particular, it highlights why some firms developed just the capabilities needed to survive in the lowest nodes of the floriculture GVCs, while other firms continued to develop their capabilities, albeit adopting export strategies/trajectories involving different levels of specialisation and diversification of sales channels and end markets. Sector specific factors such as the absence of a significant domestic market for cut-flowers; the narrow margin for failure in the floriculture export sector; and the attractive reward at the auction channel (minimum of 10% profit margin) are the initial factors that incentivised local firms to build their technological capabilities to at least the basic level required to access the Dutch auction sales channel. But these sector-specific factors did not necessarily put enough pressure on local firms for them to develop their capabilities beyond the Dutch minimum price level. These few firms showed 'satisficing' behaviour, only putting in the effort to meet the minimum requirements to export to lower markets/sales channels. As a result, they remained able to safeguard access to available privileges in the sector and protecting

their other businesses; rather than building their capabilities to the level needed for international competitiveness.

In contrast, some firms continued to build their capabilities. The fourth section of the chapter further explains that why some local firms continued to build their capabilities, as well as the divergent capability building paths among these local firms. Understanding these issues requires taking into account that local flower firms are part of diversified business groups and most of which are family-run. Each firm owner chose an export trajectory that he perceived to be a better strategy (for their firm) for minimising risk, stabilising income flow and increasing the profitability of the overall diversified business group. Subsequently, their chosen export trajectory determined which capabilities needed to be developed. However, the success of these firms varied, even between firms adopting a similar export trajectory strategy, because of firm specific characteristics such as learning speed (learning how to learn), competency in managing diversified businesses, and commitment of the owners.

Firms could adopt various export strategies/trajectories due to the presence of diverse – from low to high – requirements of different end markets and sales channels as well as levels of deepening within the same sales channel. Firms could remain at lower markets with low level of capabilities, unless they perceived it as risk to their overall profitability. Yet, the industrial policy did not have a strategy to compel firms to build their capabilities and it had no clear measurable standards and monitoring mechanism that would motivate firms to invest in learning in return for the subsidies provided to the sector.

The fifth section draws on the preceding sections and summarises the key factors and the specific causal mechanisms that influenced local firms' investment in learning. It makes a new conceptual distinction between the TC building process, identifying three dimensions of the TC building process and shows specifically which dimensions of firms' TC building process were shaped by the key variables (industrial policy, national systems of innovation, GVC governance, FDI spillovers and firm specific characteristics). The three dimensions of the TC building process are: incentivising firms' initial investment in a sector (floriculture export sector); serving as sources of knowledge/catalysing learning or expanding knowledge sources locally; and the third dimension is compelling firms' learning effort.

7.2. Incentives for investment in flower export production

The experience of pioneer and early mover local firms in the Ethiopian floriculture export sector shows that liberalisation of the long-closed economy motivated indigenous and diaspora entrepreneurs to experiment with a new business in their country, which had just emerged from political turmoil. In the context of generally limited economic opportunities, the existing public farms and Kenya's success story with floriculture exports inspired the pioneers to engage in flower export production. Kenya's success, being a country with roughly similar agro-ecological conditions such as climate and altitude, suggested

that floriculture exports could be successful in Ethiopia as well. But identifying this potentially profitable export sector was not enough. As is common in low-income countries, the primary constraints that the pioneers in Ethiopia needed to overcome to set up their businesses were the lack of financial and knowledge resources. The pioneers were able to do so, despite the widespread factor market and institutional failures in the national context, due to their ability to mobilise support from international donors, using their own networks with international donors/financial institutions, national government and the public farms. Similarly, the experience of early mover firms shows the important role of macroeconomic and political conditions in incentivising local firms' investment (Rodrik 2008; Lall 1993a).

Policy changes, such as launching an export diversification strategy and privatisation, encouraged some local entrepreneurs with significant investment capacity to invest in floriculture production without necessarily requiring targeted support. For example, the owner of B-Rose invested in the sector before the targeted industrial policy was launched. He mobilised the necessary capital from private banks, where the owners already had a track record demonstrating his good business performance and capacity to provide the necessary collateral. He went on to finance a modern greenhouse, to buy foreign knowledge, to internally create the necessary skills through on-the-job training, and to make an experience-gaining tour to Kenya. This shows the role of local entrepreneurs in catalysing the emergence of a new export sector, despite facing unfavourable conditions in their surrounding environment. However, given the limited number of those firms whose owners had the 'right' network and higher investment capacity to finance the learning period, the pace of new investment was limited.

In addition, the existing local firms faced global competition from many countries, whose firms had longer experience and higher capabilities in the sector. As Khan (2013) argues, in such mature global industries, early movers benefit from more imitation and clustering as they have little chance to generate rent through creating an oligopoly position. This is why pioneers and early movers in the Ethiopian floriculture export sector lobbied the government for support and welcomed new entrants. For instance, B-Rose kept its door open to new entrants, and many of the new firms sought advice from B-Rose and sent their workers there for on-the job training.

The slow and 'organic' evolution of the sector, composed of committed entrepreneurs who were willing to take the risk with their own money, changed following the launch of the targeted industrial policy. The industrial policy incentives, including the soft loan and cheap land, led to the entrance into the sector of local firms with diverse background who only entered because of the incentives. In addition, information about the sector expanded in Ethiopia through the promotion of the incentives (including the role of *investment brokers* who disseminated sample feasibility studies alongside information about incentives to potential investors), and the experience of the early movers created a certain level of

awareness or a basic 'list of what to do' to invest in the sector. As a result, all new local investors were aware of the need to hire foreign experts.

In addition to the industrial policy, the Dutch development program incentivised local firms' entry to the sector. The support of the Dutch government was distinct from conventional international donors' support provided to pioneer firms, since development was not the only motive, rather, the Dutch state had an explicit economic interest in the global industry that align with the Dutch auction (lead firm), which seemed to influence the design and content of their support as well as their level of dedication to the sector to provide continued, well-coordinated support for more than a decade. The expansion of the flower export sector in Ethiopia created a supply base for the Dutch auction and directly or indirectly contributed to sustaining the leading role of the Dutch in the floriculture GVCs. Apart from that, knowledge about the floriculture industry in the Netherlands was highly developed, which made it the most suitable partner for building systems of innovation in the sector, such as developing sector-specific local standards, setting up a soil laboratory service, and creating a sector-specific training centre under the industry association as well as in universities.

7.3. Local firms' sources of knowledge and catalysts for learning

Local firms that entered the sector in different phases of its development accessed knowledge from various sources and they catalysed learning through many ways. This section of the chapter presents the four major knowledge sources of local firms: foreign expertise and input suppliers, systems of innovation (collective actions, public-private partnerships, inter-firm and other horizonal relations/networks), linkages with foreign firms, and global value chain governance. Local firms interact with these sources of knowledge to various degrees, learn and build their capabilities. Below, each of the knowledge sources will be discussed one by one highlighting the casual mechanisms that catalysed firms' learning.

7.3.1. *Foreign expertise and input suppliers*

Prior to the targeted industrial policy, local investors relied on their ability to mobilise finance from international donors or from the domestic financial sector in order to access foreign expertise and hire consultants, which was possible only for a limited number of investors. But the soft loan extended to the sector largely tackled financial problems with buying foreign expertise. Those foreign experts and consultants generally played a fundamental role in enabling firms to access tacit knowledge. But the degree of knowledge accumulation and capability building varied across firms, since it required effort beyond just hiring a foreign expertise, as was seen in the firm history narratives of H-Rose and C-Rose. Rather building capabilities required firms to create collective competence, which in turn demanded

shaping and managing the skills and behaviours of workers at various levels of the organisation and their adherence to internal routines (Lall and Pietrobelli 2002; Khan 2018).

The same is true for knowledge brought by equipment and input suppliers, such as greenhouse technology, chemical and fertiliser suppliers, whom all local firms used as sources of knowledge. Apart from the codified knowledge in the form of manuals and blueprints, the input suppliers provided on-the-job training regarding the use of their specific technology. For example, greenhouse suppliers usually constructed one greenhouse with participation of local workers, who takes over the subsequent constructions; breeders or their agents provided general advice about characteristics of varieties. This type of knowledge source increasingly expanded since the take-off phase of the sector and that seems to reduce the cost of learning especially, for local firms that joined the sector around its maturity and afterwards. For instance, F-Rose and J-Rose did not need to hire foreign expertise for longer period due to the relative availability of experienced local firms that shared their knowledge, and a local workforce with adequate experience. In addition, those firms did not necessarily need to take a trip to Kenya to learn and choose inputs or varieties as it was the case for most of earlier entrants.

7.3.2. *Systems of innovation*

As widely documented in cluster literature, spatial proximity and clustering can lead to positive externalities and such collective learning, that can transform into innovation systems (Helmsing 2001; Mytelka 2007). The mass entry of both local and foreign firms in the Ethiopian flower sector and the formation of clusters encouraged inter-firm relations. Local firms' interaction that took place in both formal as well as informal settings is an important source of knowledge; and owners, managers as well as workers took part in various ways. The industry association was not only the prominent collective action of firms but also the active component as well as a coordinator of interactions in the innovation systems of the sector, which provided local firms with a common norm or standard to follow. Aside meeting the standard, going through a compliance process was instrumental for local firms' learning about the basic organisational and managerial skills required in the export sector. Unlike many industry associations in Ethiopia and in other sub-Saharan African countries, the industry association of the Ethiopian floriculture sector has been an active player since its establishment. This might be due to the characteristics of the founding chair person who had some experience of export markets, a good international network and the political connection that reached out to the late prime minister and was able to successfully lobby for support. In turn, he was able to get other local firms behind him. In addition, the association's leadership involved both competent Ethiopians entrepreneurs (for example, owners of E-Rose, L-Rose) and Dutch investors as board of directors/members, who had clear understandings of cooperation and competition, and who were able to capitalise on the partnership with the Dutch development program to strengthen the association.

The partnership between the industry association, the Dutch development program and the government, created incentives for firms to implement the minimum level of the sector's standard as well as to create stronger interaction between key actors/institutions (firms, the association, government lead agency, the Dutch development program, public research and training institutes) as in the theoretical sense of innovation systems. Which in turn, to a certain degree, drove firms' initial learning effort but the interaction declined over time as the role of government diminished, while the constraints remained. For example, the sector specific statutory minimum standard (Bronze level of sector specific standard) failed to be enforced by governance agencies, which is indicated by G-Rose and H-Rose that never been certified for any standard and B-Rose abandoned its standard for several years. Only the Dutch development program kept interacting with the industry association and with local firms, which is exhibited by the continued subsidised support of CBI consultants to local firms as well as the renewed partnership programs discussed in Chapter 4. Moreover, the failure of the government to evolve its support with the sectors' need indirectly weaken the functioning of the innovation systems, which requires keeping the *systemic-ness* - continuous interactions and co-evolution among various units. In addition, it indirectly affects the role of the active units of the systems, for instance, the industry association, which is increasingly occupied with lobbying government to tackle basic infrastructural problems and other policy issues, and shows no signs of initiating experiments in higher technologies.

Apart from that, inter-firm formal relations took place through the industry association as it provided a platform for firms to get together regularly to discuss the common constraints they faced and exchange information, particularly related to market issues and searching for foreign expertise. The association also served as a platform for managers through its training centre where joint trainings were usually organised. Beyond the formal activities, those meetings at the industry association encouraged managers and owners to sustain informal interactions among themselves. As the narratives of most of the firms showed, these interactions appear more important at entry stage of newcomer firms as they search for the 'right' technology or when existing firms faced problems such as how to jointly search and select foreign consultants or improve rose growing or protection techniques.

Informal inter-firm relations are a relatively important channel for knowledge flow, particularly through managers' knowledge network as discussed in the story of A-Rose. Production, protection and human resource managers located in various firms, across various clusters in the country, have their own network that served as the primary contact when facing bottlenecks. They interact to solve specific problems such as labour management, curing disease or improving plants' growth through informal experiments, trial and errors. In such knowledge flow, spatial proximity is important, but it is not the only types of proximity that drives knowledge flow in clusters (Giuliani and Bell 2005). The managers' network in the export sector mainly built up on their past social and cognitive proximity, such as studying similar field in the same college or university and their learning is driven not only by practical problems at workplace but also by curiosity. Although local firms appear more open for frequent visit

and informal experimentation, the managers' knowledge network also includes managers working in foreign firms, which in turn enabled knowledge spillover from foreign to local firms.

7.3.3. *Linkages with foreign firms and spillovers*

Foreign firms are considered as one of the most important sources of knowledge for firms in developing and low-income countries (Farole and Winkler 2014). The firm survey and history narratives revealed a certain level of knowledge spillovers from foreign to local firms largely through imitation or demonstration effects and to lesser extent through labour mobility, sub-contracting and joint ventures. Imitation involved various degree of interaction, from observation at a distance (e.g. G-Rose) to personal contact seeking advice on certain issues or sharing experience through managers' knowledge network (e.g. A-Rose, B-Rose, K-Rose). But sometimes the imitation/copying, especially via the managers' network, is constrained by the differences in the level of technological complexities, since certain foreign firms used more advanced and highly automated technologies in comparison to local firms. Yet it has created knowledge among those managers about the available technologies in the industry and informed their criteria for search and selection, for example, they usually screen what can be learned best from each firm in their network.

The knowledge flow through workers' mobility particularly occurred when local firms attracted skilled labour from foreign firms with prior experience in the industry. Occasionally skilled workers moved from experienced foreign firms to take higher positions in local firms and brought along their accumulated experience, including their personal network (e.g. C-Rose). Through the latter, they continued utilising the knowledge located in their previous employer firm to solve problems faced in their new position. Similarly, local firms sometimes managed to create sub-contracting linkages with FDI, which led to knowledge spillover but this also happens seldomly since only local firms that already possessed higher capabilities (absorptive capacity) could create such kind of linkage with such foreign firms (e.g. E-Rose). Similarly, joint venture created due to the Dutch subsidy program known as PSOM seemed to create significant knowledge transfer when the local partner has higher initial capabilities, including stronger networks in the sector as well as in political circles, as was the case with D-Rose. However, PSOM's initiative was not matched by the industrial policy, which did nothing to encourage joint venture formation and learning. Despite attracting both greenfield and brownfield foreign firms with and without prior experience in the sector, the targeted industrial policy had no clear strategy to induce technology transfer between local and foreign firms.

7.3.4. *Global value chain governance*

As assumed in GVC literature, upgrading prospects of local firms vary based on the way the chains are coordinated and governed (Gereffi 1994; Schmitz 2006; Pietrobelli and Rabellotti 2011). The inter-firm linkages in floriculture GVC is important learning channel for Ethiopian own firms. The relations not only allow the flow of codified knowledge into local firms but also it supports learning by doing through close interaction and on-the-job trainings, although this is not the case in all chains. The Dutch auction channel offers the best opportunity for learning, compared to the buyer-supplier relations that exists in direct sales GVC as the latter only place orders with specifications but seldomly engage in close interaction to assist suppliers to meet the requirements. Thus, supplier firms necessarily need to build a certain level of capabilities before starting to supply in direct sales channels. The Dutch auction catalysed codified knowledge flow through its standard operation that takes place at the node of its import department and suppliers.

But as explained by almost all local firms that entered the sector during the take-off phase and afterwards, it is the unpacker-supplier relations in the auction GVC that allowed further interaction and helped to master the tacit knowledge needed to meet the buyers' requirements and to improve the suppliers' position in the market. The increasing internationalisation of the Dutch auction created sector specific advantage for floriculture global industry that is not commonly found in other non-traditional export sectors, which appears to benefit the local firms. The minimum requirements of the auction, which incorporate norms and standards set by both chain and non-chain actors such as phytosanitary rules and breeder's property right protection, were easily accessible and widely applied as a benchmark across local firms. This in turn, reduced the knowledge gap, as its minimum requirements were small enough that many local firms could meet them relatively easily and then could depend on the auction as their guaranteed market, with a quick and reliable payment system. It also provided local firms with room for learning as the auction system tolerates failure to meet requirements, which is why firms kept selling their product despite having track record of rejections or re-grading such as J-Rose. Even when firms plan to diversify their end markets and sales channels, the benchmark remained valid, only requiring smaller adjustments to meet distinctive requirements. Nevertheless, governance by non-chain actors is also crucial as adopting global standards, such as MPS and Fairtrade, required investment in key areas such as quality control, monitoring and labour management, which are also central for building collective competency and international competitiveness.

In general, local firms' processes of building TC involved interaction among the actors and institutions discussed above, which served primarily as sources of knowledge. Firms drew from particular sources of knowledge at different stages of their investment. For instance, at the initial stage, foreign expertise and horizontal inter-firm relations/networks seemed to be more important, while unpacker-supplier relations increasingly became a key source of knowledge as the local firms committed to upgrade in the floriculture GVCs and to improve their market position. Nevertheless, the presence of these actors and

institutions did not necessarily incentivise all local firms to put in the same level of technological effort and thus develop their capabilities to the level needed to achieve global competitiveness. This is evident by the collapse of numerous local firms, as well as by variation in the TC scores of the survived firms.

7.4. Drivers of local firms' collapse and effort to survive

As the firm history narratives show, all local firms except D-Rose entered the sector without having much (or any) knowledge about it. They did so primarily due to generous investment incentives granted to the sector, which even motivated some investors to cancel their original business plan and instead invest in floriculture sector, such as E-Rose and K-Rose. However, large number of local firms collapsed for various reasons, including owners' arrest as was the case with the pioneer firm, natural disaster such as flood and opportunist behaviour (e.g. diverting the soft loan for unintended purposes). Apart from that, firms entered in crises because of starting their investment with a wrong feasibility study. For example, some invested in locations without sufficient ground water to sustain operations or without adequate land for expansion or they planted wrong varieties and were then unable to come out of the crisis. Others, such as local firms that were established under Sher's turnkey project appeared to be exposed to higher cost from the very beginning (paying turnkey rent) while they were still incurring learning cost, which partly seemed to be the reason behind their collapse. Although some of those firms accumulated significant production capabilities, they appeared to fail to build the strong management and market relations that were needed to cope with shocks such as the global financial crisis. But owners of these collapsed firms were not reachable (except for one) to confirm these views of key informants.

Furthermore, thanks to the widespread ready-made feasibility study accompanied by the investment incentives, several firms were motivated to set up the operations but failed in learning how to learn (Stiglitz 1987). As interviews with key informants indicated, some firms considered installing equipment and hiring skilled workers or foreign experts as sufficient condition to run competitive business. Hence, they failed to do collective learning and develop organisational routines that are central to all steps of capability building and competitiveness. Collective learning is needed to adapt technology for local conditions, ensure smooth flow of production and to set up the necessary management systems that allow performance monitoring and control. Other firms, invested in equipment, foreign experts but the owners themselves learned little about the export sector, while still keeping the top management (general manger) position of the business and making all important decisions such as steady supply of inputs, replacing old plants, developing marketing strategies and choosing varieties; which often went wrong and subsequently contributed to the firms' collapse. Yet, there were local firms that accumulated significant production capabilities but found it less worthy of more effort in comparison to other opportunities and thus sold their farm and exited the sector.

More importantly, even though industrial policy was important for local firms to enter the floriculture export sector, it played a limited role in catalysing firms' learning efforts because the generous and non-discriminative investment incentives were provided to the sector without meaningful reciprocal conditions that motivated firms to invest in learning in return for the subsidies (Amdsen 2001; Khan 2009). Although successful policy design and implementation requires learning and building capabilities by policy makers, implementation and enforcement agencies (Rodrik 2008; Cimoli et al 2009), the problems in the Ethiopian floriculture export sector are exacerbated by the political condition that seems to encourage mediocracy and corruption rather than learning and building capabilities in the government agencies. Thus, incentive allocating and governance agencies such as DBE lacked the required capabilities to select appropriate investors (firms), set performance criteria, effectively monitor loans and take credible actions to enforce contracts. Similarly, the government's sector-specific government agency (EHDA) failed to continue interacting effectively with local firms and adapt its support to their needs. Such lack of proper 'reciprocal control mechanisms' and weak enforcement of sector specific local standards might have led local firms to collapse as they made little effort to learn. It might also lead them to concentrate on less demanding and easily accessible end markets and sales channels. In these markets/sales channels, firms faced limited pressure to further develop their capabilities beyond the minimum requirements, nor to invest in upgrading and improving the quality and wellbeing of the labour force or the environment.

Nevertheless, several firms did survive. First, the floriculture GVC, specifically the Dutch auction, offered relatively attractive reward with prospect of minimum of 10 % profit margin, which appeared good enough to incentivise firms to invest in learning in order to meet the auctions' minimum requirements in more consistent manner. In addition, the absence of a meaningful domestic market for cut-flowers and the narrow margin for failure are key sector-specific characteristics that compelled firms to put certain level of learning effort to build capabilities. The floriculture production is entirely dependent on export market as the domestic market for flowers is negligible. Thus, once local firms entered to the sector, they have to build the very basic capabilities for export production. The Dutch auction allowed selling poorer quality products as long as they meet minimum criteria but meeting those criteria was not that easy due to the characteristics of the product (highly delicate and perishable) and the associated production process such as meeting phytosanitary, quality, and product specification requirements.

Once cut, the flowers have to be transported to the airport very quickly, efficiently loaded into cold storage facilities, and transported to end markets. This what Oqubay (2015, p.166) called "narrow latitude for poor performance", and it created significant compulsion on local firms to invest in capabilities that were required to survive in the specific export markets. In his recent work Oqubay (2019) argued that those sector specific characteristics created a reciprocal monitoring system implicitly suggesting those characteristics filled the gap in the industrial policy related to compelling firms'

learning and building their capabilities. However, this claim didn't recognise that the level of compulsion created by such sector specific characteristics does not necessarily pressure firms to develop their export capabilities beyond the basic minimum level required for exporting, given the presence of diverse – from low to high – requirements of different end markets and sales channels as well as levels of deepening within the same sales channel. Some of the markets with lower requirements do not create enough compulsion on firms, so that they make efforts to develop managerial and organisational skills that heighten the capabilities needed for competitiveness. Although firms' levels of capabilities are dynamic, owners might choose to remain at lower markets with low level of capabilities unless they perceived it as a risk to the overall profitability of their diversified business groups, as shown by B-Rose and G-Rose.

7.4.1. Divergent capabilities levels of survived local firms

The effort of local firms to survive and further build their capabilities can be understood better when the firms' behaviour is explained in the context of their diversified business groups. As the firm narratives showed, local firms entered into the export sector based on owners' relative perception of risk and reward about the export sector, compared to other opportunities available to them as well as in relation to their diversified business groups. Owners' perception about the export sector is influenced by their existing investment capacity (their access to capital), knowledge about the business and relations/networks at national as well as international levels. But those perceptions are subject to change as more knowledge is gained. It might also change as attractive business opportunities emerge and firms are able to participate in various businesses. In the case of the latter, firms' calculation or perception of risk towards one of their diversified business may not necessarily be determined by internal factors of the very specific business only but also, in relation to overall diversified business groups of owners.

As the firm history narratives indicated, the local firms seemed to exploit the rents brought in by any of their diversified businesses in order to increase the profitability of and/or reduce risk in their overall business groups. As they are mostly family-run businesses, internal separation of these diversified business groups tends to be blurry, allowing easy reallocation of resources among these many businesses, without necessarily facing challenges by shareholders or similar structures. However, as indicated by most of the firms, such as A-Rose, B-Rose, G-Rose and K-Rose, being part of a diversified business group has its own advantages and disadvantages in relation to the success of the flower firm. For instance, diversified business groups can inject capital during challenges, but it can also cause failure if the firms have poor management systems in place and if owners lack the capability to manage diversified businesses.

For most local firms, flower export production is one of their diversified businesses that have various productivity potentials and degrees of reward and risk, which in turn shaped owners' resource allocation

within the businesses. The flower export sector brings certain privileges, such as access to foreign exchange, cheap land and others, which is vital to local firms; not only to run their flower export but also their other diversified business groups. For example, most local firms own domestic market-oriented businesses that require foreign currency, such as importing, real estate, construction, retails. Generally, the diversified business groups run by local firms are less demanding but offer higher and quicker returns compared to cut-flower export business. As it is evident (explicitly or implicitly), from the firm histories, some firms' commitment to the cut-flower business reduced over time but chose to stay in the sector to protect the interest of their overall business, such as to improve their access to foreign exchange, to assure their alliance with the government and not to be seen as 'rent seekers' by the government, which could damage their overall business.

Thus, local firms' investment to build capabilities of their flower business is determined not only by the perceived risk in the very sector or by features of the GVCs but also by the issues related to other business groups of the owners. Explaining the divergence in firms' level of capabilities needs to take account of these factors. Although most firms began exporting via the Dutch auction channel, due to shocks or proactively to minimise risk (not to put all their eggs in one basket), they tried to diversify their end markets and sales channels. Over time, mostly due to crises/shocks related to the flower or their other businesses, their export trajectories, effort and capabilities diverged. Two firms (B-Rose and G-Rose) exhibited 'satisficing' behaviour, only putting in effort to the extent that their business appeared good enough to access all available privileges of the sector and protecting their other businesses, rather than building their capabilities to the level needed to compete in the global industry. As Khan (2013) argued, such firms focus on maintaining the rent rather than in raising their competitiveness in the global industry. In doing so, despite the suffering of their flower export business, the firms protected their reputation and profitability of their overall business groups.

Satisficing behaviour was sometimes observed in the remaining nine firms as well, but in less obvious ways since they continued to put effort to develop capabilities beyond the minimum but chose different strategies depending on their perceptions of what was a better strategy (for their flower firm) to minimise risk, stabilise income flow and increase the profitability of the overall diversified business group. For example, some firms focused on deepening in the auction channel, like E-Rose, F-Rose, M-Rose; the other six firms followed the export trajectory of diversifying into higher and lower markets, as was the case with A-Rose, C-Rose, D-Rose, J-Rose, K-Rose and L-Rose. In turn, their export trajectories influenced how they built their capabilities, as they responded to varying levels of pressure on different capabilities to achieve competitiveness in their chosen end markets and sales channels. Nevertheless, the success of firms within each group varied because of firm specific characteristics.

Firms' use of different strategies to competitively respond to changing markets impacted their capabilities. For example, as explained by the firm history narratives, when firms were adversely

affected by a similar market condition (e.g. Euro currency fluctuation or volatile price), they reacted in different ways. While one firm spontaneously tried to diversify end markets and sales channels (e.g. A-Rose), others did the same but alongside strategically building the necessary capabilities, such as conducting market intelligence, creating customer relation office and adjusting its management system, while as the same time diversifying into or investing more in their other low risk businesses that are typically oriented towards domestic market (e.g. K-Rose). As Lall (1993, p.724) indicated "there is no predictable learning curve down which all firms travel" so, despite sharing a common environment and dealing with the same technology, firms differed in their responses to internal and external stimuli leading to idiosyncratic results in their capabilities. Even when they follow more or less similar export trajectories, there is variation in their capabilities due to firm specific characteristics, such as their speed of learning how to learn, entrepreneurial competencies, the design and functioning of their internal hierarchy as well as their level of commitment to the flower business in relation to their diversified business groups.

Some local firms stood out with higher competency and speed in accumulating the necessary tacit knowledge, develop relatively higher and dynamic capabilities that enabled them to quickly identify and respond to bottlenecks, redesign organisation production process and thus continuously improve productivity and competitiveness (e.g. E-Rose). While other firms learned/are learning to do so more slowly or with less success (e.g. F-Rose and A-Rose). Initial experience of firms in related sectors played a role in this regard; for instance, the owner of D-Rose, the only local investor with prior experience. This owner had a good understanding of the business and the global dynamics, which helped him to design a clear strategy and use the 'right' networks (locally and internationally) to set up his business and to develop the 'right' capabilities; although this does not mean that it led to D-Rose building higher capabilities. Since the latter decision depends on many other factors, such as the perceived risk and reward of flower business in relation to the diversified business groups.

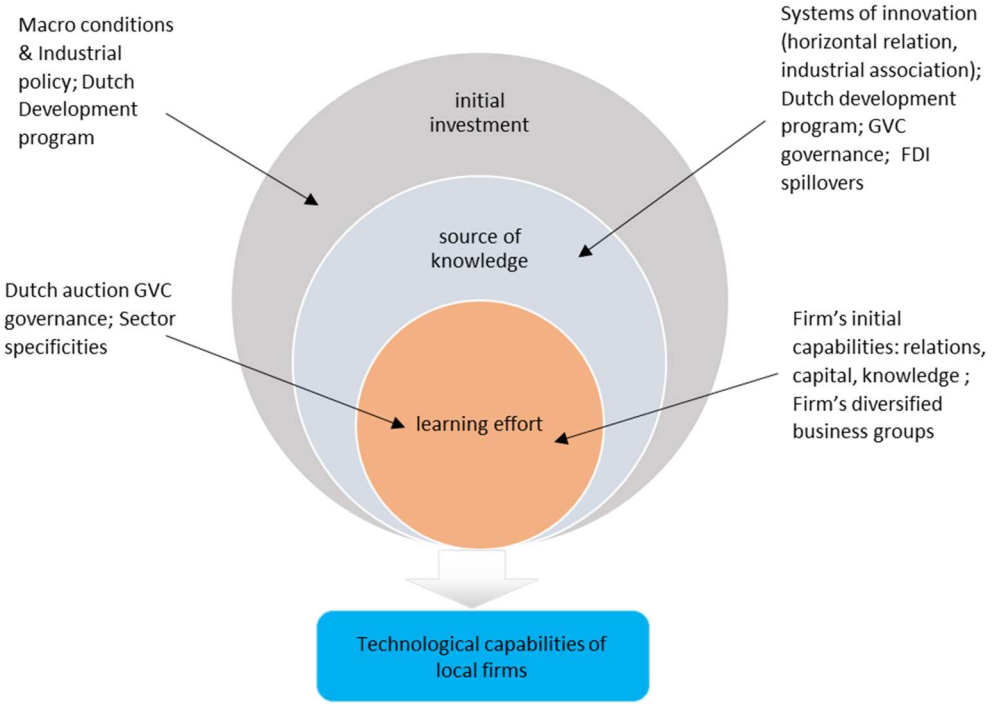
Similarly, capability scores of firms seem to be influenced by firms' ownership types, as shown by the performance of endowment firms (owned by political parties). For example, the two party owned firms managed by highly hierarchical and bureaucratic structures continuously conflicted with the nature of the sector, as it requires rather lean management style that allow speedy decision and easy intra-firm interaction and learning. The firms also showed poor commitment or lacked sense of ownership, as they showed a limited urge to deliver or fix bottlenecks and avoid unnecessary capital investment.

7.5. Drivers of Ethiopian-owned firms' investment in learning in floriculture

The above discussion is consistent with what has been highlighted in Chapter 2, Figure 2.2., which identified macroeconomic and industrial policy, national innovation systems, GVC governance, FDI spillover as well as firm specific characteristics as the main factors that shape firms' investment in

learning. Yet, the causal mechanisms discussed in Chapter 2 are not fully present in the floriculture sector of Ethiopia, while other 'new' mechanisms were uncovered in the sector. Macroeconomic conditions and industrial policy, foreign expertise, systems of innovation (mainly comprising mainly horizonal relations and partnerships of industry association and Dutch development program), GVC governance (indirectly linked with Dutch development program) and sector specificities, FDI spillovers, sector specific issues as well as and firm specific characteristics are the main factors impacting local firms' investment in learning. However, to specifically show how those key factors influenced the learning and capability building process, it is important to go beyond the literature discussed in Chapter 2, which generally identifies key factors and their causal mechanisms but doesn't explicitly show how specifically firm-level TC building process takes place due to these factors. This thesis attempts to do so; as presented in Figure 7.1 below, three conceptual distinction of TC building process is made: incentivising local firms' investment in the floriculture export sector, sources of knowledge/catalysing learning of firms or expanding of knowledge locally, and compelling learning effort. The key factors can influence firm-level capability building processes through shaping one or more of the three dimensions of TC building process, which in reality may not be separable. The existence of learning effort implies the existence of a knowledge source (internal or external) as well as investment to acquire and master the knowledge. Whereas the presence of the first two don't necessarily imply presence of learning effort that is needed for capability building.

Figure 7.1. Key factors and mechanisms shaping specific dimensions of local firms' capability building process in the Ethiopian floriculture sector



Source: author's construction based on the findings of the thesis

As depicted Figure in 7.1. macroeconomic conditions and industrial policy influenced local firms' capability building process, primarily through supporting or enabling their initial investment in the sector. The more conducive the national environment and higher the support of the government was, the more local firms have entered the export sector and became able to participate in the floriculture GVC. To a lesser extent, Dutch development support, which came after the industrial policy targeted the sector, also played similar role through subsidising entry of joint venture firms to the sector. Prior to that, the lack of a conducive environment and policy slowed investment growth in the sector and limited the success of firms' learning effort. The industrial policy also indirectly influenced the expansion of knowledge sources locally, but it was the systems of innovation comprising firms' collective actions (industry association), inter-firm and other horizontal relations/networks, the Dutch development support, FDI spillovers and GVC governance that directly served as source of knowledge for local firms and catalysed their learning process. Furthermore, the floriculture GVC governance influenced firm's learning efforts; in conjunction with sector specific characteristics such as relatively attractive reward with prospect of minimum of 10 percent profit margin at the Dutch auction, the inherent narrow margin for failure that exists in the sector and absence of domestic market for cut-flowers.

More importantly, learning effort is shaped by firm specific characteristics (their experience, capital and relations/knowledge), which also influences the nature of firms' interactions with sources of knowledge and supporting institutions as well as impacting their decisions about to what level TC get built. For instance, firms' ownership types might create less constrained access to capital but don't necessarily incentivised firms to learn, particularly in context where government's monitoring and enforcement mechanisms are poor, certain ownership types might have more negative impact in learning effort, such as party-owned firms, which lacked a sense of ownership and the necessary management delegation to make meaningful technological effort. Furthermore, firm's initial capabilities or owners' knowledge about the business or related sectors, their relations/networks and their investment capacity (capital) mattered for firms' learning in the export sector. The latter also includes whether the flower firms are part of family-run diversified business groups, which can provide financial support during crisis. Importantly, diversified business groups have a broader implication for firms' decision to invest in learning, as they are part of the formula when owners calculate risk and rewards of their flower firm. Thus, the characteristics of owners' diversified business groups, the risks/rewards they entail, as perceived by the owners, determines owners' resource allocation and their capability building decision in relation to each business sector.

However, the role of industrial policy is very limited in terms of compelling learning effort due to the missing causal mechanisms discussed in Chapter 2 that policy strategies need to include 'carrot and stick' approach to ensure the proper utilisation of incentives and create compulsion on firms to make

learning efforts. But, the industrial policy in floriculture export sector largely provided 'carrot' without 'stick', which largely explains why the policy had limited impact in pressuring firms' to put in learning effort. The constraints related to policy design and implementation are also reflected in the role of innovation systems and FDI spillovers, where the industrial policy lacked mechanisms to induce interactions, knowledge transfer and learning efforts that evolve over time, along with the needs of firms.

The role of industry association, as key component in the systems of innovation, included supporting firms in meeting local and international standards, which are largely shaped by the requirements in the floriculture GVCs. Thus, pressure to meet international standards is part of causal mechanisms that operated between firms and the floriculture GVCs as well as the national innovation systems, highlighting direct and indirect role of GVC governance in expanding sources of knowledge locally. In addition, the governance in the floriculture GVC, especially unpacker-supplier relations in the auction channel, which involved deliberate knowledge transfer and mutual learning, became a key source of knowledge as the local firms committed to upgrading in the GVC and improve their market position.

7.6. Conclusion

This chapter took broader view of the empirical chapters, particularly the firm history narratives and addressed the specific research questions of the thesis to do with under what conditions and how industrial policy, the national innovation systems, FDI spillover, GVC governance as well as firm specific factors influence local firms' investment in learning and their TC building in floriculture export sector. It highlighted the major drivers of local firms' investment in the sector; and their source of knowledge and catalyst for learning. It also explained the various factors that influenced firms' collapse and their survival as well as divergent capability scores. Furthermore, the chapter expanded the theoretical framework presented in Chapter 2 and made further analytical distinction of TC building process into three dimensions*: 1) incentivising firms' initial investment in a certain sector; 2) serving as sources of knowledge/catalysing learning of firms or expanding of knowledge locally; and 3) compelling learning effort.* These dimensions can be used in analysing firms' TC building process in any sector and context. The application of the three dimensions in Ethiopian-owned flower export firms showed that macroeconomic and industrial policy were prominent in influencing the first dimension of TC building process. The second dimension is primarily influenced by systems of innovation, including inter-firm horizontal relations and Dutch development support, FDI spillovers and GVC governance; while the third dimension is mainly shaped by sector specific and firm specific characteristics and the latter factor needs to be unpacked further to account the role of firms' diversified business groups in shaping their learning effort. The general implication of this and the overall findings of the thesis will be presented in the last concluding chapter.

8. Conclusion

Economic development is largely driven by increases in productivity, which is mostly the result of learning how to do things better and accumulating knowledge at the level of firm, economy as well as society (Stiglitz and Greenwald 2014). Particularly, firm-level capabilities are the building blocks in expanding knowledge-based sectors, which have greater potential for rapid growth of productivity, employment and income, which are central for structural change and economic development. Therefore, firms in low-income countries, such as Sub-Saharan Africa, need to build their capabilities to the level that enable them to successfully compete in fast changing global market (Lall et al 1994; Noman and Stiglitz 2015; Newman et al. 2016). In the contemporary global economy, competitiveness is no longer determined by prices alone, but increasingly depends on firms' ability to develop dynamic capabilities that enable them to keep up with knowledge acquisition and sustain a process of upgrading in global value chains.

However, accumulating TC and sustained upgrading requires learning, which is a complex, costly and risky process and the outcomes are uncertain. As a result, firms often refrain from doing so. Particularly in environments like Sub-Saharan Africa, where market imperfection and institutional failures are widespread; learning costs and uncertainties are high, which further discourages firms' initial entry into knowledge-based sectors, let alone leads them to develop capabilities. Despite such difficult circumstances, a few African firms such as the Ethiopian-owned firms in the floriculture export sector did emerge as successful exporters in a highly competitive global industry. This thesis examined the TC building process of those firms and the key factors that shaped the process: taking into consideration the national and global context in which the firms were embedded, since firms' learning and TC building processes do not take place in isolation, but rather in interaction with their external environment.

In concluding, this chapter summarises the contribution of the thesis in terms of confirming as well as elaborating on what is known in the existing literature, but also shedding light on new issues that have not been examined before, while highlighting interesting areas for further research. It also briefly highlights the implications of this thesis for Ethiopia and other African countries that aspire to drive structural transformation using industrial policy. The latter is particularly important because the Ethiopian floriculture export sector is broadly recognised as model for successful African industrial policy.

As the technological capabilities approach indicated, firm-level TC building is the result of an interactive process of the internal learning effort of firms and the external environment that incentivises firms to demand TC as well as provide the necessary inputs (such as finance, skills, knowledge and infrastructure which reduces learning cost and encourages TC development). In relation to this, the thesis reviewed various bodies of literature to systematically identify key factors in national as well as global contexts that influence firm-level process of TC building. As presented in Chapter 2, separate but related

literature identified industrial policy and innovation systems, GVC governance, FDI spillovers, and firm specific characteristics as the key factors that shape firms' investment in learning. The causal mechanisms associated with each key factor are summarised in Table 8.1.

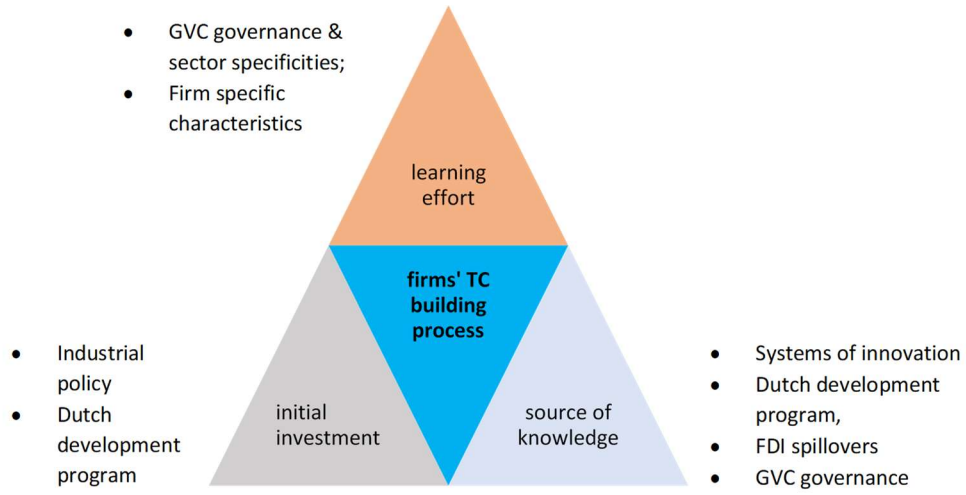
Table 8.1. Key factors and their mechanisms shaping firms TC building generally and in the Ethiopian floriculture export case

Key factors in literature	**Mechanisms in literature**	**Key factors in Ethiopian-owned firms' experience**	**Mechanisms in Ethiopian-owned firms' experience**
Industrial policy & systems of innovation	Macro conditions, financial & non-financial incentives, carrot & stick approach; technology policies (importing, licensing, FDI); technology institutions; horizontal inter-firm and other interactions and co-evolution in systems of innovation	*Industrial policy and systems of innovation:*	Macro conditions; financial & non-financial incentives; systems of innovation (technology importing, FDI policies, sector specific collective actions, horizontal relations, knowledge networks)
GVC governance	Imitation; pressure to meet international standards; mutual learning; deliberate knowledge transfer; spillovers	*GVC governance & Dutch development program:*	Pressure to meet international standards; mutual learning; deliberate knowledge transfer Financial subsidy, developing sector's systems of innovation
FDI spillovers	Imitation, labour mobility vertical linkages, joint venture, sub-contracting	*FDI spillovers*	Imitation, labour mobility, joint venture, sub-contracting
Firm specific factors	Prior experience, diaspora, émigré, state ownerships	*Firm specific factors*	Prior experience, ownerships, diversified business groups

Apart from confirming the importance of these key factors, the thesis moves a step forward by making a conceptual distinction about dimensions of firms' TC building process. As shown in Figure 7.1 in the previous chapter, there are three dimensions of the TC building process that the key factors can influence. The first dimension is incentivising firms' initial investment in a certain sector; secondly, serving as sources of knowledge or expanding knowledge sources locally and catalysing learning; and the third dimension is compelling firms' learning effort. The existence of learning effort implies the existence of knowledge sources (internal or external) as well as the investment to acquire and master the knowledge; whereas the presence of the first two does not necessarily imply the existence of learning effort that is needed for capability building. In reality, the three dimensions of TC building process are interactive and may not be separable from each other, but the conceptual distinction is important to provide a more nuanced view about how specifically the national and global factors influence the process and how firms' learning takes place. Figure 8.1 shows how the key factors influenced the TC building process of Ethiopian-owned firms by breaking the TC process into the three dimensions—initial investment, source of knowledge and learning effort—and indicating which factors mattered most

in each dimension. The three dimensions can be useful in assessing the process of learning and firms' TC building in other sectors as well as contexts.

Figure 8.1. Three dimensions of TC building process and key factors shaping each dimension in the case of Ethiopian-owned firms



Industrial policy is one of the key factors discussed in the literature underlining 'functional' policies addressing factor market problems, improving macroeconomic management, investment climate as well as encouraging firms to enter the knowledge-based sector. Furthermore, selective industrial policy was found to be important in shaping firms' investment in learning and TC building process (Lall 1993a; Noman and Stiglitz 2015). Through selective industrial policy, government can lower entry barriers and the cost of learning in selected sectors and incentivise entry of specific types of firms/investors. It can also selectively attract/import foreign knowledge, such as FDI, promote linkages to incentivise local firms' investment in learning and building their TC. The empirical evidence of this thesis confirms some of these roles of the industrial policy, since it provided financial and non-financial incentives to both local and foreign investors and thereby improved sector specific infrastructures as well as supported the development systems for innovation in the sector. Through those mechanisms, the industrial policy played major role in incentivising initial investments of local firms (as indicated in Figure 8.2.) and indirectly influenced expansion of knowledge sources; yet, the policy had limited role in compelling learning effort. The latter is due to lack of appropriate mechanisms in the industrial policy to compel learning, which is consistent with the existing literature.

As Khan and Blankenburg (2009) argued, firms do not necessarily use *learning rents* to invest in learning. Based on extensive industry policy case studies, drawn from Asian and Latin American countries, the authors showed that firms do not make learning efforts unless they are explicitly compelled through clear institutional mechanisms enacted in an industrial policy. Nevertheless, the Ethiopian industrial policy targeting the floriculture sector did not incorporate such compulsion mechanisms in the first place. This kind of omissions at the early industrial policy designing exercise is understandable, as successful policy design is a difficult task with limited possibilities to know in advance what works well (Rodrik 2008; Noman and Stiglitz 2015). As policies are context specific, a successful industry policy can only be learned through practice or learning by doing. This seems the case in Ethiopia, even when Meles Zenawi (the late prime minister) was chairing the policy design and implementation process.

The policy makers in the Ethiopian floriculture export sector seemed to treat acquisition of technology as technology transfer in the neoclassical sense: TC building as automatic by-product of importing machineries and blueprints and putting them into production. Hence, the policy provided incentives, including soft loans and tariff free imports, to get those machineries and cheap land to install them in operation. However, it was not clearly specified which agencies were supposed to monitor and enforce learning in exchange for the incentives provided to firms. The financer (DBE), like any bank, is expected to ensure repayments of its loan and allowed to take several measures to recover bad performing loans, including taking over management of firms and foreclosing it, but it is not clear if the DBE had clear mandate to ensure firms' learning. As long as the debt was paid regularly, the bank seemed not to bother about the learning and TC of the firms. As indicated before, in the context of diverse sectors generating various levels of rents created by industrial policy, firms can use different financial sources to settle the loan without being pressured to build capabilities and competitiveness in the very export sector for which they were granted soft loan. The same is true for the lead government agency in the sector, which is expected to support the sector and facilitate access to services, including land allocation, but it has no mandate to monitor firms' learning performance and enforce proper utilisation of incentives.

As Khan and Blankenburg (2009) further underlined, even incorporating compulsion mechanisms in the industrial policy alone is not adequate for successful implementation and enforcement of learning. Rather, the effectiveness of the mechanisms depends on their *compatibility* with organisational and structural aspects of the political power in society, which is also known as political settlement. Although it was beyond the scope of this thesis to examine the political settlement and the compatibility, experience drawn from the Ethiopian floriculture export sector suggests that it is an interesting area to examine further in future research. For instance, despite the omission of compelling mechanisms, initially the industrial policy in the Ethiopian flower export sector seemed to enjoy some success in incentivising firms to comply with the statuary minimum but the success has declined over time. Following the death of Meles Zenawi there was further a deterioration *of the conditions needed for a*

successful industrial policy (Whitfield et al 2015). It was he who initially saw the *mutual interest,* particularly linked to addressing foreign exchange and employment problems, and he promoted the sector by chairing the council meetings concerning the sector. As he had almost full control of the federal and regional government and service sector bureaucracies, he was able to move policies and implementors in directions that he wanted relatively easily, without necessarily creating a formal structure and authority in place. As a result, his approach seemed to create certain level of learning in sector-specific institutions. But obviously as it was one person show, this couldn't be sustained once that person dies or loses power, which is why Rene Lefort, a prominent researcher and political analyst of Ethiopia, said: "Meles left with the password" indicating the huge political and administrative vacuum his death left behind, which increasingly led to political factions in the coalition government.[57]

As Noman and Stiglitz (2015) highlight, this might be partly due to the fact that policy makers need to learn and redesign policies with knowledge about the importance setting measurable standards, monitoring performance, and clearly specifying the mandate of agencies and bureaucrats to do so. However, in the case of the Ethiopian floriculture sector, as mentioned in Chapter 4, learning doesn't seem the (only) major problem. Rather, the political condition, underpinned by ethnic federalism introduced by the incumbent government in 1990s, appear to favour ethnic composition and political loyalty over merit, which indicates less 'political will' to promote learning and building capabilities in the government agencies. While implicitly encouraging mediocracy, ethnic-based favouritism and corruption. The latter has seemed to get worse since the death of Meles, due to the increasing political faction and turmoil that led to political change, which has already been unfolding in Ethiopia since April 2018. Whether this change is going to create the necessary conditions for successful industrial policy remains to be seen.

Systems of innovation is the second key factor that influences firms' TC building. Although firms themselves are central components in systems of innovation, it is largely composed of technology policies and institutions/organisations that provide knowledge inputs to capability building and support services for innovating/upgrading firms (Edquist 1997; 2005). But technology policies and institutions are not limited to government, rather, it includes collective actions, horizontal relations and networks in cluster (Lall and Piterobellie 2001; Oyelaran-Oyeyinka and McCormick 2007). The literature highlights that the interaction and co-evolution of the policies and organisations constituting systems of innovation (or the components) is critical for the effectiveness of the system. The interaction and co-evolution define the *systemic-ness,* which is crucial to continuously identify technological needs and constraints of firms/sectors as well as to tackle the bottlenecks and address the needs in the same manner. Without

[57] https://revolutionfordemocracy.wordpress.com/2016/11/24/ethiopias-crisis-by-rene-lefort/
Last accessed in January 2019.

this systemic-ness, the mere presence of some technology policies and organisations within a national boundary does not create nor sustain effective innovation systems.

The experience of the Ethiopian' floriculture export sector supports the above argument presented in the literature and the industry association played key role in creating systemic-ness among the sector's institutions and policies through coordinating activities of several actors and facilitating interaction and co-evolution among them (for example, firms, government lead agency, Dutch development program). As a result, it significantly impacted the source of knowledge in the sector (as shown in Figure 8.1); albeit in a limited manner, it did also influence learning effort. The industry association undertook innovating as well as coordinating roles but gained limited support and incentives to sustain the interaction and co-evolution; mainly because the government (one of the key components in the innovation systems) dropped out instead of evolving policies to address emerging needs and bottlenecks as well as pressuring for more industrial upgrading and firms' TC building. As mentioned above, this also constrained the potential impact of SI in relation to compelling firms' learning effort.

Nevertheless, the concept of national innovation systems was useful in drawing attention to the importance of systemic-ness: the interaction and co-evolution of firms and their environment in order to drive learning and TC building. The role of the industrial policy also needs to be seen from this perspective of influencing the systems, their interaction and co-evolution. However, the literature gives inadequate attention to coordination, which is needed for effective systems of innovation[58]. Clear coordination supported by deliberate policies is key to creating and sustaining systemic-ness, especially in low-income countries, where market imperfection is prevalent, private initiatives and national institutions are weak. As the Ethiopian case shows, the industry association, largely driven by collective interest of its members, played the coordination role needed to ensure interaction and co-evolution but this could only lead to limited upward mobility on the technology ladder, as it didn't receive the necessary support that incentivised as well as compelled the association to do so.

In addition to national context, factors in the global arena also shape firms' TC building process. GVC governance is one of the major global level factors identified in the literature that impact the firm-level process of TC building. The different types of GVC governance (market, modular, relational, captive and hierarchy) create various degrees of upgrading potential and TC building opportunities for supplier firms. Building on the work of those scholars, Pietrobelli and Rabellotti (2011) showed the important role of such extra-national knowledge, highlighting the nexus between GVC governance and national innovation systems. Moreover, the authors drew an explicit link between specific types of governance and learning mechanisms. In market governance types, imitation is assumed to be the major learning mechanism; in modular governance, pressure to meet international standards is assumed to be the major

[58] Oyelaran-Oyeyinka and McCormick 2007 are among a few exceptions that emphasised the importance of coordination.

learning mechanism; in relational governance, mutual learning is assumed to be the major learning mechanism; in captive governance, deliberate knowledge transfer is assumed to be the major learning mechanism; in hierarchy governance, labour mobility and imitation spillovers, among others, are assumed to be the major learning mechanisms.

However, the empirical evidence shows that the links between governance types and learning mechanisms are more complex. In the auction-oriented floriculture GVC, the unpacker-supplier relationship involved various learning mechanisms, such as mutual learning, deliberate knowledge transfer as well as pressure to meet international standards, depending on the strategic intent of the supplier firm and its export trajectories. In a similar vein, unlike the governance typologies that Gereffi et al (2005) suggested, governance at specific node of a GVC may not be fully captured by the characteristics of single governance type; this is because inter-firm relations at a certain node might have overlapping features that describe more than one of their governance types. For example, the unpacker-supplier relations have a feature of both captive and relational governance types. Although the transaction, to a certain extent, is codifiable, it involves significant tacit knowledge, which requires close interaction between supplier and unpacker firms and also involves significant investment, which in turn makes switching cost high for both parties. In addition, unpacker and supplier firms have complementary competencies that usually reinforce mutual dependence regulated by trust. These are features of relational governance but in the same node the capabilities of suppliers are often low, which is contrary to what is expected in relational governance yet common in captive chains. In this node, suppliers enter a sort of captive relation with an unpacker in order to build their capabilities but the power of unpackers to 'lock in' supplier firms into confined activities is limited.

Apart from that, this thesis is consistent with the GVC literature that views the strategic intent of the suppliers as very important in determining their upgrading in GVCs (for example, Humphrey and Schmitz 2002b). Since the vast amount of GVC literature focused on buyers/lead firms' strategies in analysing upgrading opportunities of supplier firms, this thesis contributes to the relatively small segment of the literature on suppliers' strategies by providing micro level evidence on how supplier firms' strategic intent shapes their upgrading in specific GVCs and also how their strategic intent is shaped by contextual factors outside the GVC, such as their diversified business groups which factors into firms' risk calculation.

In addition to the factors that are broadly acknowledged in literature, this study reveals that the Dutch development program was an additional key factor that shaped firms' TC building process. It did so mainly through its prominent role in the systems of innovation and serving as a source of knowledge to firms, but also through incentivising initial investment. The Dutch development program is distinct from conventional donors' program as there is clear alignment of economic interest between lead firm in the GVC (the Dutch auction) and the Dutch state; and perhaps also between the Dutch FDI and the Dutch

state. Most likely this alignment of interests motivated the Dutch state to provide large-scale support for the Ethiopian floriculture export sector, which has been sustained for a rather long period. The economic motive is integrated with the objective of development cooperation ('aid and trade'), which provided support beyond financial subsidy that created significant access to knowledge and contributed to institutional building in the sector. This type of lead firm-state strategic alignment has not received consideration in the literature. Even the GPN literature, which focuses on the role of the state, does not pay attention to this type of relationship, nor does the literature on strategic coupling between lead firm, FDI and the state in host countries (For example, Coe and Hess, 2011; Mac Kinnon 2012).

FDI is another key factor that influence firms TC building process, assuming that FDI flows into the host country with a bundle of codified and tacit knowledge, which is superior to what is already available there. As a result, local firms expected to get direct or indirect access to FDI knowledge through various spillover mechanisms but direct spillover requires meaningful levels of interaction that can allow for learning (Morrissey 2012). Nevertheless, the literature broadly identified imitation, labour mobility, linkages, joint ventures as the major channels of FDI spillovers (Crespo and Fontoura 2007). The case of Ethiopian floriculture also showed that FDI spillovers influenced local firms' TC building through serving as a source of knowledge, although to a limited extent. However, as knowledge flow between Kenya and Ethiopia indicates, indirect FDI spillovers occur through regional dynamics, without necessarily having the FDI operating within a specific national boundary. Since the Kenyan floriculture sector is more advanced than Ethiopia's and involved broad participation of FDI, the Ethiopian sector attracted Kenyan and other foreign expertise that circulated in the region and generated indirect FDI knowledge spillovers. The later expansion of the sector in Ethiopia has attracted foreign expertise from Kenya in three ways: firms' themselves going to Kenya to recruit expertise and learn from the experience there; the foreign experts (Kenyan and non-Kenyan by origin) themselves moved to Ethiopia looking for opportunities; and lastly, foreign firms moved from Kenya to Ethiopia bringing some of their experts along. This points to the existence of knowledge spillovers from the regional dynamics, which might even be stronger than FDI spillovers through commonly identified mechanisms mentioned above. Although directly measuring spillovers is already a difficult task and comparing across sources would be even harder, it is important to expand the debate about FDI spillover channels and paying more attention to such regional dynamics.

Apart from external variables discussed above, firms' internal and specific characteristics is a key factor in driving firms' investment in learning and TC building. As highlighted in literature, firms' initial capabilities (knowledge, capital, relations), and types of ownership matter (Lall et al 1994; Morris & Staritz 2014). The experience of the Ethiopian-owned flower firms confirms that firm specific characteristics like firms' competence in assessing risks, choosing the 'right' strategies, and building the 'right' network, determine firms' learning effort, their interaction with systems of innovation as well as their upgrading trajectories in GVCs. However, higher initial capabilities or types of ownership that

create better access to financial resource does not necessarily compel local firms to put in learning effort and build higher capabilities. This is so especially in the context where the firm owners run diversified business groups with various degree of risk and reward. The diversified business groups factor into the risk calculations of the owners and their subsequent strategies and decisions in terms of resource allocation and TC building.

In relation to the latter issue, the existing literature does not identify family-run diversified business groups as a firm specific factor that influences their decision and strategies related to their capability building. But as the empirical evidence in this thesis shows, failing to consider the effect of firms' diversified business groups significantly limits understanding firms' behaviour in relation to their TC building. This is particularly true in Ethiopia where industrial policy was broadly implemented targeting various sectors simultaneously. In a country like Ethiopia, where the capitalist class/business community is very small, it is likely that the same individuals, family or party-owned firms operate across different sectors and own diversified business groups with various degrees of rewards and risks, as manipulated by the industrial policies specific to each sector. Owners' decision regarding building TC in one of the many sectors they participate in depends on perceived risks and rewards related to the very sector as well as in relation to the other businesses in the diversified groups.

This means that reaching a deeper understanding of firms' investment in learning and TC building, in the context of firm owners running diversified business groups, requires uncovering the detailed industrial policy structure that manipulates rents in various sectors, and how owners of diversified business groups utilise the learning rents and build their technological capabilities in each of the sectors. If the industrial policy failed to compel firms' learning effort in targeted sectors and if learning rents are exploited to expand less productive and *quick and easy money* sectors, the consequence might be seriously damaging to the economy. In fact, this might mean that the industrial policy has the opposite effect: disincentivising investment and learning in high productivity /knowledge-based sectors, while rewarding less productive and easy money sectors. The thesis was able to point out these dynamics based on the firm history narratives, but it was not possible to make a systematic analysis of the industrial policy structure that affects various sectors in the diversified business groups run by flower firm owners, since this was not in the original scope of the research. But the latter is interesting area for future research.

The above discussion shows that all the key factors identified in the literature influenced the firm-level process of TC building of Ethiopian flower firms to various degrees. However, industrial policy is the dominant external factor with greater potential to shape all the three dimensions of TC building process through directly/indirectly enabling and supporting but also impeding the process of TC building. It can do so through direct interventions, such as providing incentives and compelling learning, but also

through interaction with other factors, such as selectively attracting FDI and inducing learning as well as enforcing some of GVC requirements as statutory minimum.

The implication of this thesis for Ethiopia's broader industrialisation effort and the economic development of other African countries can be extrapolated from the above discussion as well. Extra-national economic factors, such as FDI and GVC participation, can offer significant opportunities but expanding domestic productive capabilities or absorptive capacities at various levels is a pre-condition to harness these opportunities. Therefore, the aim of national policies (industrial, trade and technology) of low-income countries in relation to extra-national economic factors need to be based on how best the extra-national factors can be leveraged to enhance domestic capabilities for sustainable economic development. Although policy making in low-income African countries is constrained by international (e.g. WTO regulations) and national conditions (e.g. balance of payment problem), there is still room to systematically exploit these opportunities with carefully designed policies. In designing policies, it is important to clearly understand that attracting FDI in knowledge-based sector or participating in GVC is only the easier part of the long and more difficult process of building domestic capabilities. Thus, the industrial policies need to be more future looking (sustainable) than addressing short-term problems.

Ethiopian industrial policy of the floriculture export sector is considered as a successful model for African industrial policy (Oqubay 2015; UNCEA 2016). Indeed, the policy had certain future looking aspects and achieved significant success. For instance, the industry's backward linkages with the packaging sector and forward linkages with Ethiopian Airlines. However, the policy is not adequately future looking and does not sufficiently aim for endogenization. Rather, the policy appeared largely driven by a rather short-term vision, such as tackling the lack of foreign exchange (which can also significantly be addressed by other means like foreign aid and diaspora remittance) and creating a significant quantity of employment, with limited concern about the quality of employment and protection of the environment. In this regard, the industrial policy did not adequately capitalise on the upgrading opportunities created by the floriculture GVC. For example, market pressure incentivised the industry association to develop a sector specific minimum standard, but the industrial policy failed to enforce them despite its significant implication for firms' TC building as well as improving other socially desirable impacts of the sector through social upgrading and protection of the environment. In addition, although the industrial policy largely succeeded in selectively attracting a number of experienced foreign firms, it generated modest knowledge spillovers, partly because the industrial policy did little to incentivise interaction between FDI and local firms. Furthermore, the industrial policy provided extensive non-discriminative incentives to both local and foreign firms but made little attempt to attach compelling mechanisms to ensure firms' learning, which is crucial in order to expand domestic capabilities. The policy deliberately or spontaneously laid a foundation for innovation systems in the sector but did not succeed in sustaining its progress with active and evolving policies. Therefore,

Ethiopian policy makers and other African countries can learn from those successes as well as failures of the industrial policy of the Ethiopian floriculture sector.

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Appendix 1 Floriculture Sector Local Firm Survey Questionnaire Ethiopia 2016

(administered by the researcher)

PART I: FIRM PROFILE

Name of firm	
Address (cluster name) Website	
Name of interviewee Job title Duration of employment	
Ownership structure/nationality	a) Indigenous b) Indigenous-diaspora (lived outside the country for an extended period of time) c) Diaspora (may not have citizenship, but lives their permanently) d) Joint venture (specify equity distribution and management control)
Date of establishment Date of production/export	
Total size of land holding(ha) Cultivated land size (ha)	
Number of employees	
Product type today (%)	a) Rose b) Summer flower c) Bouquet flowers d) horticulture
Name main product: # of varieties of main product(s).	
Export destinations (%)	a) Europe -auction -direct b) Middle east c) Other
# of export days per week to/via	d) Europe -auction -direct e) Middle east Other
Average annual export (volume) *In USD/Euros*	
Certificates:	a) Bronze: c) MPS: c) other (specify)

PART II: INVESTMENT

Was a feasibility study carried out before the initial investment?	a) No b) Yes By whom?
Had the owner/GM experience in the sector or in business?	a) No b) Yes Explain:
How did the firm get managerial expertise and skilled labour in the beginning?	a) Buy it from abroad (foreigners). From where? b) Employ nationals with previous work experience in flower farms. From which firms? a) Trained workers and/or managers
How was location selected?	b) Allocated by govt c) Based on feasibility study/market research d) Other
How were varieties selected? **Now?**	a) Just following g what other firms do (neighbors) b) Amount of royalty fee c) Based on product life cycle analysis d) Experimenting what is best on the location e) Producing what buyers demand/ based on market research f) Other
With how many varieties of roses the firm started exporting**?**	
How was the investment finance raised? How was working capital raised?	a) DBE (govt bank) b) Locally owned private bank c) Sister company d) Joint venture-PSOM or other subsides e) other
How did the firm get its first buyer? *auction:* How did the firm access auction? *Direct sale:* **How did the firm access/establish contact to buyers in :** - Europe? -middle east? -Other?	
Equipment	
What are the main features of your greenhouse?	a) mechanical ventilation system b) flexible window opening c) fixed window opening d) Climate registration and sensors
Why you select the specific type of greenhouse?	
Have you changed your greenhouse since first time? If yes, when and why?	

How does the fertigation system work in the greenhouse?	a) Fertigation at fixed time interval and no automatic adjustment b) computerized fertigation automatically adjusted based on climate data (radiation) c) computerized and automatically regulate fertigation (amount and proportion) with additional sensors

PART III: END MARKET

Do you know your main buyers in auction? **If Yes,** **How many are they?**	
Do you have direct contact with the auction buyers?	
If YES, How did you establish that?	a) Via FloraHolland direct b) Other
How stable are your relationships with your auction main buyers? **If a) ask # of years and with how many buyers**	a) Stable b) Somewhat stable a) Ad hoc
In direct sale, who are main buyers? **How many in:** **-Europe?** **-Middle east?** **-Japan?** **-others?**	
How stable are your relationships with your main buyers? **If a) ask # of years and with how many buyers?**	a) Stable b) Somewhat stable c) Ad hoc
What are main difference in buyers' requirements of different end - markets?	
Does the firm has contract with direct buyers? If yes, give general features: **Duration, price, quantity and quality**	
How does price determined in direct sale to: -Europe? -middle east -Japan -Other	a. Fixed- cost-price plus b. Negotiation based on auction c. Other (specify)
Which end market offer best price?	a) Europe b) Middle east c) Japan d) other

Which market channel offer best price?	a) Auction b) Direct sale
Why did you diversify end market?	
Has the firm engaged in market intelligence and market & buyer research? **How? list**	

PART IV: PRODUCT and PRODUCTION PROCESS

Describe the main products & portfolio? (%):	a) Sweethearts-small b) Intermediate c) Large flower d) Other
Average annual internal reject rate? **Market place reject rate** ***Average unit price of products?***	
What is your most frequent product grading score for Dutch Auction?	a) A b) A1 c) B
What measures the firm took to improve quality?	
At what stages do you monitor quality in GH and PH?	
From where or from whom do you get advice to improve product quality?	a) Auction b) Local firms (in a formal/informal settings) c) Foreign firms (in a formal/informal settings) d) Hired consultants e) breeders f) EHPEA (growers' association) g) EHDA (government agency) h) Other (specify)
Do you promote your products? **How? list**	If yes, How? a. Via website b. Participating in trade fairs (local and international) c. Printing logo on packages d. CSR e. Other (specify)

What do you do to prevent and cure diseases?	a) Chemical spray, b) Integrated pest management (IPM) c) Both (a and b) d) Other (specify)
How is supervision of workers organized in GH and PH?	
How do you deal with production during seasonal market fluctuations (low/high seasons)?	a) Destroy b) Fill the gap or share surplus from/with neighbour/friend farm c) Other__
How do you deal with labour during seasonal fluctuation?	a) Hire casual labour b) Engaging them in other work internally c) Sending them temporarily to other firms d) Lay off e) Other
Do you record data? **On what issues?**	
EFFICIENCY & PRODUCTIVITY	
Firm's profit % before tax 2015? ***Did the firm incurred loss since establishment? how many times ?)***	
# of workers per hectare	
Unit cost (ETB and/or USD): ***Production cost:*** ***Transport:*** ***Marketing:***	
LABOUR MANAGEMENT	
Share of expatriate workers? **In which positions?** **Development (10 years)?**	
Have locals increased their share in management, technical jobs, supervisors?	a) No b) Yes
Which group of workers do you often hire from other farms?	a) General workers b) Supervisors and other staff c) Managers, d) Other
Labour turnover? **Absenteeism?** **Unrest downtime?**	Average per year: Average per year: Average per year: Is there a seasonality component?

Does the firm have a labour retention strategy?	a) No b) Yes What is it?
Is training offered to workers? **If Yes,** **Type of training, by whom?**	a) Internally b) Externally
Is the firm has HR policy?	a) No b) Yes

PART V: SUPPLY CHAIN LINKAGES

Where does firm get information from on markets, buyers, products, technology, production, etc.?	a) Local firms b) Foreign firms c) Buyers d) Hired consultants e) Industry association f) Relevant ministry/public institution g) Other:
Is the firm a member of an industry association?	a) No b) Yes Which? How often does it meet? Main benefits for your firm?
Does the firm participate in collaborative schemes or informally with other firms? **Horizontal/competitors or vertical/suppliers?** **If so, what kind of schemes (training, input sourcing, etc.)?**	a) Limited links with other firms b) Medium links c) Close networks Local firm Foreign firm
How often does the firm seek knowledge or advice from other firms on how to improve production and marketing?	a) Not very often b) Sometimes c) Very often Which firms?
COOL-CHAIN	
Do the firm own cold truck? If no, where do you get the service?	a) Yes b) No
Do the firm have challenges related to cool-chain management? If yes, describe	
Are there challenges related to cargo booking and handling services? If yes, explain	a) Yes No
What is your relation with the handling agent/distribution centre at end market?	a) Buying the service b) Joint venture

	c) Other (specify
Do buyers have responsibility in relation to logistics? If yes, what?	a) Yes b) No
INPUTS	
How is your relationship with breeders? Explain	a) Not good, unable to get certain varieties b) Discriminations in accessing certain varieties c) Good, able to access varieties as wanted d) other
Do you propagate plants at your farm? If yes, why?	
How do you source inputs?	a) buy it from local importer/supplier % chemical: fertilizer: packaging: b) Import it internally% chemical: fertilizer: packaging: c) other
What are the main challenges in managing input sourcing?	

PART VI: FINANCE & SUPPORT

Does the firm have relationships with external public & private institutions? **Which are most important institutions?**	a) Limited links with institutions b) Medium links **c)** Close networks
Does the government (Ministry of Industry, industry-specific agencies) provide support services to the sector? **Does your firm participate in those services?**	a) No b) Yes What kind of support services? a) No b) Yes Which? Are they useful?

Does the firm have access to sufficient investment and working capital?	a) Yes How? b) No Why not?
Does the firm interact with any education or research institute?	a) No b) Yes Which ones? How?
Does the firm buy management, technical or administrative/IT consulting services?	a) No b) Yes Which areas? From whom? a) Foreign firms b) Domestic firms

PART VII: PRODUCT DIVERSIFICATION

PRODUCT DIVERSIFICATION	
Where and how do you sell the new products?	
What changes did you make to deal with new products?	a) Investment b) Production c) Supply chains and linkages
What are advantages & challenges of working in different products and market?	

Appendix 2. Source of primary data and number of respondents

Numbers of respondents	Survey	Semi-structured interview	In-depth interview (firm narratives)
13	Local firms		10
		Key informants:	
1		EHPEA director	
1		EHPEA project officer	
5		Former farm managers/employees of local firms, expert	
1		Pioneer of the sector	
1		CBI's consultant	
		Institutions:	
		EHPEA	
		EHDA	
		DBE	
		Market actors:	
1		Dutch auction-unpacker firm	
1		Dutch auction- online trader firm	
1		Royal FloraHolland auction commercial manager for East Africa	
2		**FDI**	